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Southern Medical Association, New Orleans, Louisiana, November 30 - December 1-2-3, 1937

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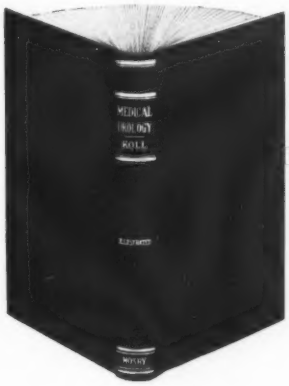

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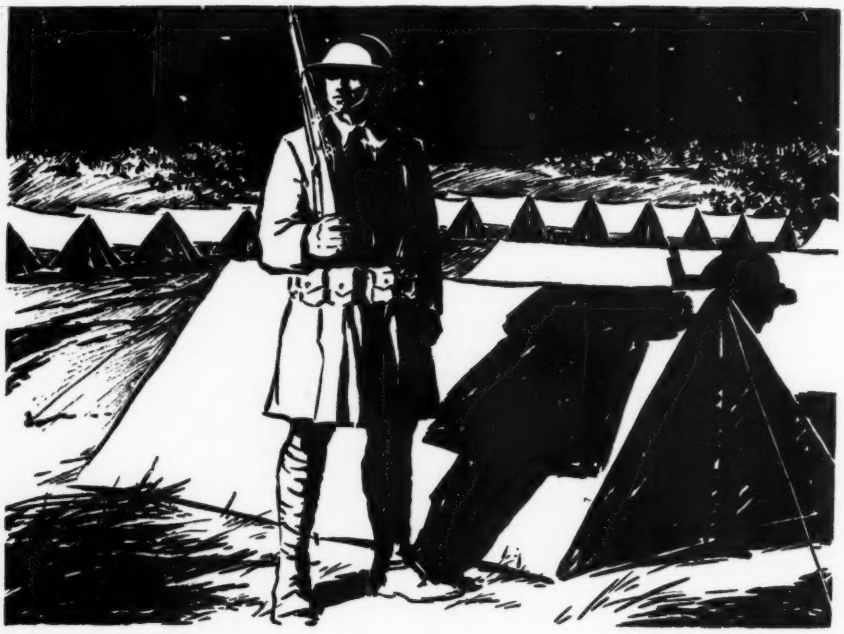

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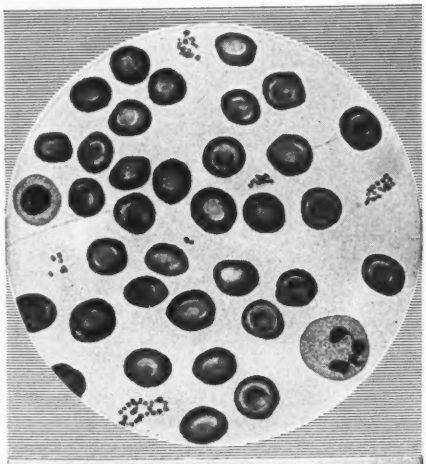

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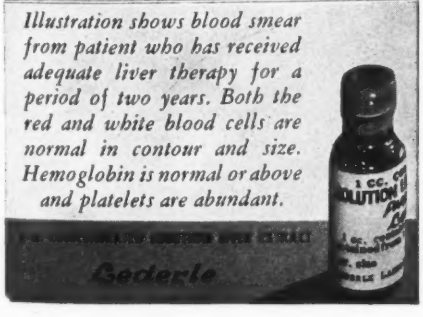

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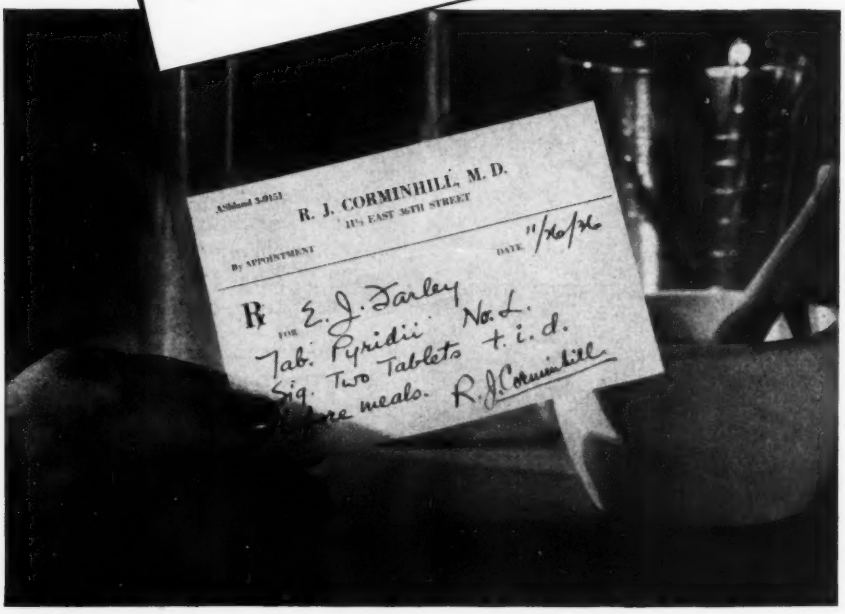

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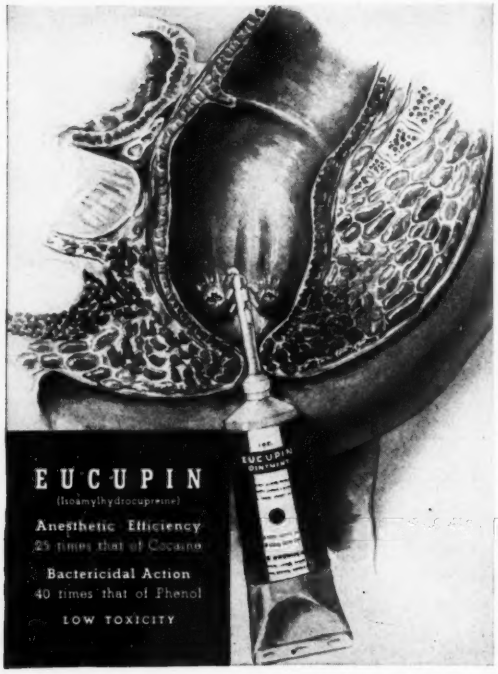

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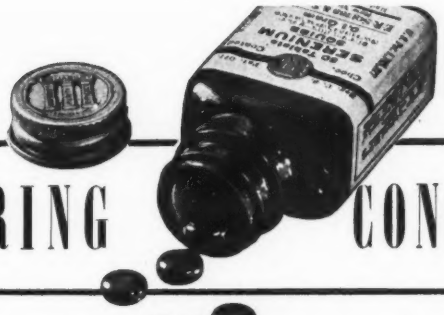

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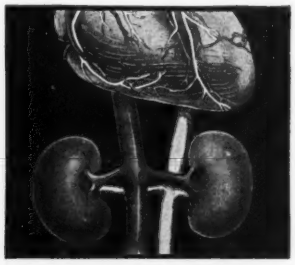

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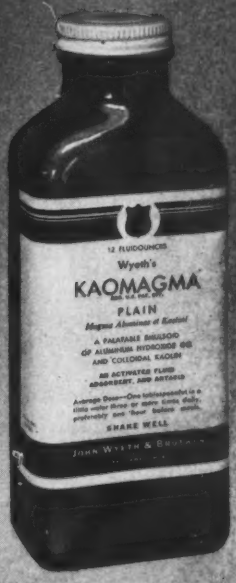

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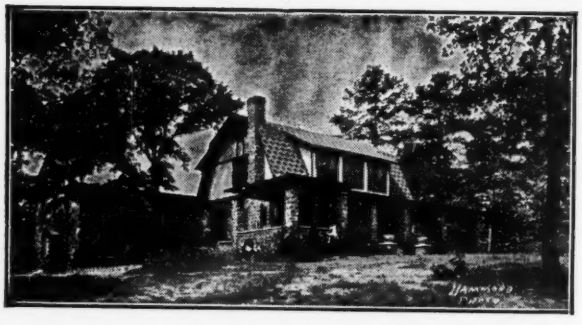

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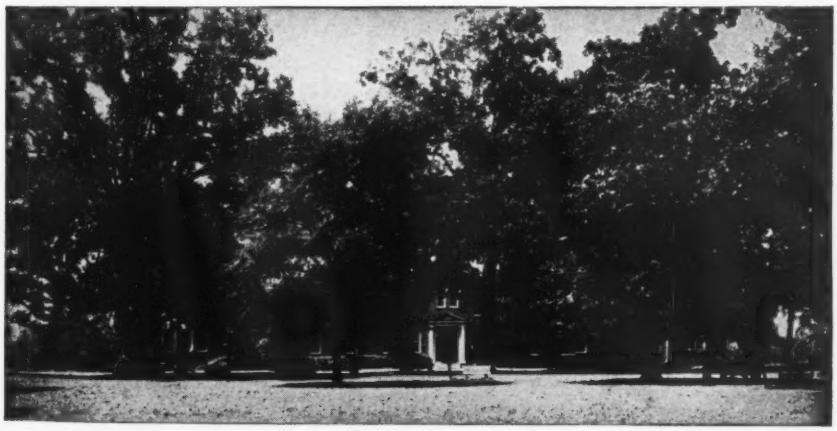

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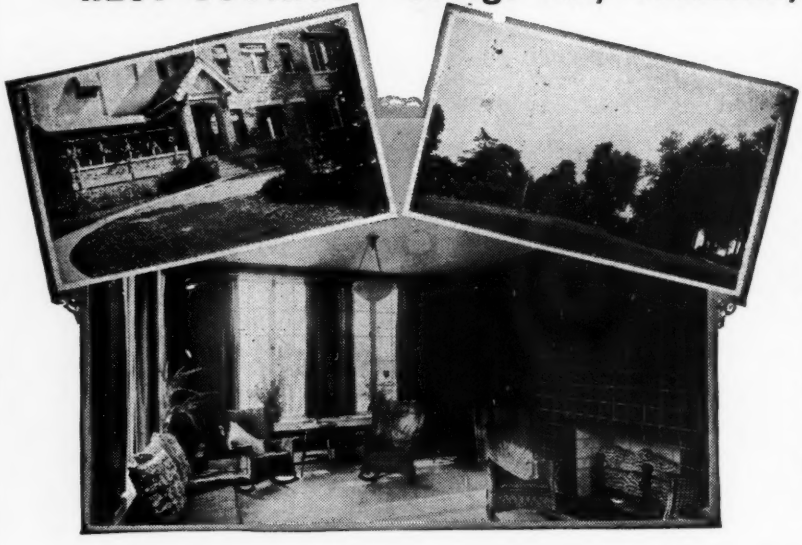

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Volume 30 SEPTEMBER 1937 Number 9

ABDOMINAL CARCINOMATOSIS, KRUKENBERG TUMOR TYPE, WITH CASE REPORT*

By CHARLES PHILLIPS, M.D.
Temple, Texas

Since 1896, when Krukenberg[1] published his article on a peculiar neoplastic association between an infiltrating type of cancer of the stomach and bilateral ovarian malignant tumors, there have appeared a number of articles on this subject. He considered the condition a peculiar type of primary sarcoma of the ovaries followed by the metastatic gastric lesion. Later, students of this condition reversed this order, and so, for many years, the profession has regarded the tumor syndrome as starting in the stomach and followed by double ovarian metastasis. Gradually, the name of Krukenberg came to be associated with the condition, and many of the pathological features of the original cases were retained, particularly the occurrence of a mucus-containing, "signet ring" form of cell considered by many pathognomonic of this type of cancer. Some writers have centered their interest upon the gastric lesion, some on the ovaries, while still others simply reported new cases.

There is no exact way of knowing how many cases have been recorded, for they continue to appear in discussions of regular papers; and, if this is true in recent years, surely the total must be higher than that recorded. The author has gone systematically over the literature for the past ten years, and until October, 1936, there are sixty-seven articles on Krukenberg tumor. The majority are in foreign journals, representing surgical work in most countries with journals of sufficient value to be entered by reference in the *Quarterly Cumulative Index*. Few of them note as many as ten cases studied, while most of them concern one or two cases. Apparently, a fair estimate for today is about one hundred twenty-five. All those articles in English during this decade have been read and may be said to represent a cross section of world opinion, since many have gone thoroughly into the past. Typical of these are the articles of Major,[2] Jarcho[3] and Commando.[4]

Critical interest has centered upon the nature of the Krukenberg tumor until, by common consent, it has come to be called a carcinoma. Typical of detailed study of ovarian cancer is that of Hundley,[5] who, in our own SOUTHERN MEDICAL JOURNAL, in 1931, reported the results of a systemic survey of a large amount of material at Johns Hopkins Hospital. After carefully culling this, he found only three cases of Krukenberg tumor, and he insists that the "signet ring" cell is practically essential to a diagnosis of this condition. From another great clinic, Masson,[6] in 1934, could find only five. An interesting reflection of the variation in pathological terms used to describe the condition is the use of "colloid carcinoma of the Krukenberg type," used in Masson's paper. Much attention has centered on the peculiar behavior of the cancer of the stomach in usually producing a "leather bottle stomach," but within this decade no outstanding article is found describing detailed work on this phase of the Krukenberg tumor. It is generally agreed that the cells of the gastric carcinoma metastasize in three possible ways to the ovaries: by simple implantation, by retrograde lymphatic embolism, and by the blood stream. Support for each route is offered by the writers, but apparently most students believe that peritoneal implantation is most common. Major[2] reports pulmonary metastasis as being proved. In many cases reported, the ovarian tumors were below the surface and so, direct implantation is difficult to maintain. Vignes[7] studied the relationship of stomach cancer to pregnancy and called attention to the usual occurrence of Krukenberg tumor during active sex life. Crousse and Dupont[8] did the same. Many writers question the

*Read in Section on Pathology, Southern Medical Association, Thirtieth Annual Meeting, Baltimore, Maryland, November 17-20, 1936.

possible specificity of colloid carcinoma of the stomach for the ovaries when metastasis occurs, but, as yet, there is no good explanation for that notable diagnostic feature of Krukenberg tumor. A few instances are recorded in which parts of the alimentary tract other than the stomach have been the source of the primary cancer. Among these are Bennett and Douglass,[9] with the jejunum as primary; Armstrong and Wolfe,[10] with the appendix; Masson,[6] with the rectosigmoid; Roblee,[11] with the jejunum; Runyeon,[12] with the sigmoid. As yet, nobody has reported a Krukenberg type tumor with the primary cancer in other than the gastro-intestinal tract. On the other hand, cases are well known with metastatic cancer of only one ovary.

This paper has been prompted by the occurrence, a year ago, of a case in which the diagnosis was not finally made until autopsy, although at surgical exploration an apparent carcinomatosis was revealed. Medical literature has many similar cases, for the disease is of insidious onset and many patients do not seek medical aid until the tumors are already well established. A survey of the literature leaves doubt as to the recovery of a single case. Involvement of parts of the body other than abdominal organs is not frequent, but cases are recorded such as that of the breast as *Case 9* in the 1930 volume of the "Surgical Clinics of North America."[13] In order to call the attention of surgeons and pathologists again to the possibility that obscure abdominal carcinomatosis may be due to Krukenberg tumor and not easily recognized, the following case is reported:

Mrs. L. H. R., who was white, female, aged 40, was admitted to the clinic on June 25, 1935, with her chief complaint that of "soreness in the stomach." Her past history showed very little of definite value. The menstrual history was negative. She had been married sixteen years, but had never been pregnant. The gastro-intestinal history was negative except for the fact that the patient had had some dizzy spells about a year previously which had cleared up when she had several abscessed teeth removed.

About three months before entering the hospital, she began to have cramping pains in the epigastrium, usually with meals and passing off in about a half hour but returning with the next meal. She had not been nauseated and had not vomited. During this period of three months the patient had lost twenty-nine pounds of weight. For the two weeks before she entered the hospital she had felt better and was without epigastric pain. There was only a soreness there now.

Physical examination showed little of definite value. There was some tenderness in the right hypochondriac, the umbilical, and the right iliac regions, and there was a little enlargement of the liver. Pelvic examination revealed several small uterine tumors, a moderate uterine retroversion, and prolapse.

Fractional test meal gave a low normal acid curve. The basal metabolic rate was plus 2. The blood Wassermann and Kahn reactions were negative. The red blood cell count was 5,088,000, the hemoglobin 80 per cent, and the white blood cell count 7,500, with 70 per cent polymorphonuclears, 27 per cent lymphocytes, 2 per cent eosinophils, and 1 per cent basophils. The urine was negative. X-ray studies of the gastro-intestinal and the genito urinary tracts were negative.

The patient was dismissed from the clinic on June 26, 1935, with advice to have an abdominal exploration later if symptoms continued.

On July 12, 1935, she returned to the hospital quite ill and three days later was explored, with the finding of several small pedunculated fibroid tumors of the uterus and a diffuse involvement of the omentum, the mesentery, the surface of the ileum, and the appendix in what appeared to be carcinomatosis. Adhesions were numerous. The omentum and the mesentery were studded with a large number of small, firm, yellowish nodules. A little of this material was removed for pathological study. It was thought unwise to do more at this time, and so, after simple myomectomy for the pedunculated uterine tumors, the incision was closed with drainage.

The pathological report at this time showed a chronic inflammation of obscure type involving the omentum and the bowel surface, with a peculiar hyperplasia of prominent connective tissue cells. Re study of this material a year later showed the same omental picture but a surface metastasis to the ileum by some ill-defined type of cancer. Cells of the latter gave no hint as to the probable original focus.

The patient was dismissed to her home on August 4, 1935, but was advised to return in two months for observation and x-ray treatment.

She returned to the hospital on September 23, 1935. Examination showed a moderate secondary anemia and a negative urine. A liver function test and x-rays of the chest, the heart, and the esophagus were negative, but there was found a carcinoma involving the pyloric third of the stomach, with definite reduction in capacity. The abdomen was much distended with fluid, which, when reduced by paracentesis of 188 ounces of straw-colored fluid, allowed a pelvic mass to be felt. All structures there were fixed. X-ray treatments were continued until October 3, 1935, when the condition of the patient made it seem wise to stop. When questioned about her symptoms, she stated that difficulty with taking of food had steadily increased, although there was a little gain in weight. Under intravenous fluids, she did fairly well for a few days but gradually became weaker, could retain nothing by mouth, and had a re-accumulation of a large ascites. In a few days her temperature began to climb until it reached 107° axillary, on October 22, 1935; and she died the same day.

Autopsy showed a negative heart and chest, but a generalized carcinomatosis, involving all abdominal viscera. The stomach was of the "leather bottle" type, from an infiltrating carcinoma which showed no mucosal lesion but which had resulted in a marked reduction in capacity. The stomach wall at the cardia was 4 mm. in thickness, 9 mm. in the mid-portion and 13 mm. at the pylorus. The entire intestinal canal below, with thinned omentum, and the mesentery, the uterus, the tubes, and the ovaries were matted into a tangled

mass by adhesions, with numberless small, discrete, yellowish nodules of from 5 to 10 mm. diameter scattered everywhere. After considerable dissection, the uterus proper was found to be relatively uninvolved except for a mass of fibroid tumors. The endometrium was thin and atrophic. The left ovary had in its interior a small, nodular, hard tumor, while the right ovary was identified in its adherent mass only by microscopic sections. Other organs showed only incidental toxic changes.

The true character of the process was not known until the microscopic study showed the Krukenberg tumor type of cancer with an apparent primary infiltrating carcinoma of the stomach and bilateral ovarian secondary growths. The predominant cells were not of the "signet ring" type but were rounded and pale-staining and generally had central nuclei. In the stomach the mucosa was relatively intact, although involved in extensive deposits, as were submucosa, muscle, and serosa. No great amount of fibrosis was present. In the bowel below, the extensive small metastases largely involved the serosa, although, occasionally, muscle bundles were split. The omentum and the mesentery were extensively involved with foci of poorly differentiated cancer cells, difficult to identify as to nature and source. An occasional mesenteric lymph node showed small deposits of these cells. The uterus and the tubes were involved only by the pelvic inflammation, with the endometrium atrophic. In each ovary there was found a small carcinoma beneath the cortex. That on the right side had no surface indication. The cells were spindle, elliptical, or rounded, generally had central nuclei of even size, and were found in columns separated by thin fibrous bands. Each growth was poorly defined and had its cells merging gradually into the fibrous ovarian stroma. Only a few signet ring cells were present. Study of the other organs of the body showed only changes incidental to toxemia with no metastases outside the abdomen.

The findings have been regarded as those of carcinomatosis of the Krukenberg tumor type, because of the "leather bottle" type of infiltrating carcinoma, not arising, as usual, from the mucosal cells; because of bilateral ovarian secondary growths; and because of multiple metastases into the ileum, the omentum, the mesentery, and lymph nodes. Relatively few "signet ring" cells of colloid carcinoma were present, but it is well known that uniformity of cell form is not essential to a diagnosis of Krukenberg tumor. Any other source of the abdominal masses was eliminated by careful search of the body.

COMMENT

This patient was like many others in having vague early symptoms, and this fact was the cause of delay in diagnosis. Of several pieces of tissue removed for pathological study at the first operation, only one showed cancer cells, and these were so poorly differentiated that they were missed at the first study and definitely placed as to importance only on restudy. Autopsy revealed a diffuse involvement of all abdominal viscera in a tangled mass of adhesions with multiple small focalized deposits of malignant cells in the omentum and the mesentery and on the bowel walls. An unusual degree of thickening of the pyloric third of the stomach wall was present, but gross and microscopic studies showed no musocal lesion. Neither here nor in any metastatic deposit was there to be found attempt at acinus formation by the cancer cells. The "mucocellulare" behavior of these in this case was not common, and "signet ring" cells were relatively few. The bilateral ovarian tumors were almost insignificant, one being found only microscopically. In common with others, this patient ran a progressively fatal course.

CONCLUSIONS

Another case of Krukenberg tumor is reported as a warning to surgeons and pathologists that obscure abdominal carcinomatosis may not have as a primary tumor the organs usually involved. It should be remembered that Krukenberg tumor is not absolutely rare and that it should be considered in suitable cases as a cause for abdominal carcinomatosis.

BIBLIOGRAPHY

1. Krukenberg, F.: Fibrosarcoma ovarii mucocellulare (carcinomatodes). Arch. f. Gynaek., **281**:321, 1896.
2. Major, R.: A Study of the Krukenberg Tumor. Surg., Gyn. & Obst., **27**:195, 1918.
3. Jarcho, J.: Krukenberg Tumors and Their Practical Problems. Amer. Jour. Obst. & Gyn., **13**:288, 1927.
4. Commando: Krukenberg Tumor. Amer. Jour. Surg., **26**:575, 1934.
5. Hundley, J. M.: Tumors and Other Secondary Ovarian Carcinomas. Sou. Med. Jour., **24**:579, 1931.
6. Masson, J.: Krukenberg Tumors of the Ovary. Amer. Jour. Obst. & Gyn., **27**:825, 1934.
7. Vignes, H.: Cancer of the Stomach and Pregnancy. Paris medical. **24**:249. 1934.
8. Crousse, R.; and Dupont, A.: Ovarian Metastases of Epitheliomas of the Digestive Tract: Krukenberg Tumors. Bruxelles med., **15**:902, 1935.
9. Bennett, A. E.; and Douglass, M.: Krukenberg Tumors of the Ovary, with Report of a Case Secondary to Adenocarcinoma of the Jejunum. Amer. Jour. Obst. & Gyn., **21**:91, 1931.
10. Armstrong, M. V.; and Wolfe, S. A.: Krukenberg Tumor of the Ovary. Amer. Jour. Obst. & Gyn., **27**:906, 1934.
11. Roblee, M. A.: Secondary Adenocarcinoma of the Ovaries from the Jejunum. Amer. Jour. Obst. & Gyn., **18**:790, 1929.
12. Runyeon, F. G.: The Krukenberg Tumor. J.A.M.A., **103**: 1199, 1934
13. Case 9. Krukenberg Tumor with Massive Hyperplasia of Breasts. Surg. Clin. N. Amer., p. 1271, 1930.

DISCUSSION (*Abstract*)

Dr. Harry C. Schmeisser, Memphis, Tenn.—Ewing states that under the term fibrosarcoma mucocellulare carcinomatodes, Krukenberg in 1896 described a peculiar malignant tumor of the ovary, usually bilateral, of considerable dimensions, maintaining the form of the ovary, of myxomatous appearance, occurring in young or old subjects, growing slowly, usually with ascites, sometimes chylous, and eventually fatal by extension and recurrence. The structure presented small groups or a diffuse growth of large polyhedral or rounded cells with mucoid contents compressing the nucleus into a "signet ring" form. In the diffuse areas the cells were intimately intermingled with the stroma so as to suggest an origin from stroma cells or endothelium. Kruken-

berg's first case presented a large cyst with carcinomatous wall on one side, a solid tumor on the other, while there was extensive invasion of lymphatics of abdomen, stomach, pleura, and bronchial and axillary nodes, a condition not commonly observed in other ovarian carcinomas. Krukenberg failed to point out the close resemblance of his tumors to secondary carcinoma of the ovary and he was unable to determine from which ovarian element the tumors arose. These deficiencies were soon supplied by Wagner, Romer, Schlagenhaufer, and Glockner, with the demonstration that this peculiar tumor may be exactly reproduced by secondary carcinoma from stomach and other abdominal organs, and that the great majority of such growths are secondary tumors in other organs.

It is still generally admitted that there are primary tumors of the ovary of the Krukenberg type, and cases reported by Glockner, Schenk, and Rosthorn are regarded as examples. It is obvious that cases without autopsy, as that of Outerbridge, are unavailable in the discussion. In Glockner's case both ovaries were much enlarged, and extensions from one had eroded the spinal column. The entire tumor had a myxomatous texture and there were liquefaction cysts. One portion presented diffuse myxomatous tissue, while in another the structure was distinctly alveolar. Schenk described bilateral tumors in a subject 27 years of age, one weighing 2,300 grams and presenting the typical structure.

Although Marchand and Chiari were unable to find any primary tumors in the cases of Krukenberg and Schenk, and doubtlessly no such tumors were demonstrable, it still seems uncertain that the typical structure of secondary mucoid carcinomas can be exactly duplicated by primary carcinoma of the ovary. It is not always possible to demonstrate the primary focus in cases of widespread carcinoma of the abdomen with involvement of the ovary, although the structure is not always of Krukenberg's tumor.

Glockner states that the typical structure may be seen in portions of alveolar carcinoma of the ovary, but the typical cases show little or no alveolar structure. Ewing has studied five secondary ovarian tumors of this type, and one primary carcinoma with myxomatoid areas. The structures, while similar, were far from identical, the primary tumor containing distinctly alveolar areas. None of these tumors gave evidence that the stroma reaction was neoplastic or sarcomatous, or that the large cells were derived from the stroma. Ewing is inclined to believe, therefore, that the pure Krukenberg tumor is always secondary, and that primary carcinomas presenting this structure regularly yield areas of a different type. The Krukenberg tumors, both primary and secondary, are uniformly fatal.

I recently had the opportunity of studying a Krukenberg tumor of the ovary. It occurred in a white woman, aged 29 years, admitted to the John Gaston Hospital July 13, 1936, complaining of bilateral masses in the lower abdomen. On July 17, a bilateral salpingo-oophorectomy was done. The abdomen was explored manually and no other evidence of tumor formation found. The one ovary weighed 1,160 grams and the other 700 grams. They were grossly and microscopically characteristic.

On July 27, the patient said that she had had quite a bit of stomach disorder since the tumors first became noticeable. Further clinical study pointed to the presence of a gastric carcinoma with abdominal metastases which had not been detectable on admission. On August 20, a laparotomy revealed a chyliform ascites and at the pyloric end of the stomach a colloid carcinoma which had metastasized to the abdominal lymph nodes.

Characteristic of the Krukenberg type of tumor was the great involvement of both ovaries for which the patient sought relief and the relatively insignificant primary colloid carcinoma of the stomach, which was at first overlooked.

Dr. Phillips (closing).—I appreciate the discussion on this paper. The additional case cited today illustrates the difficulty of keeping accurate count of the number of Krukenberg tumor reports. As a consequence, in the paper I have given an estimate of the total for two reasons: first, because reports are so widely distributed over the medical world that I doubt that any single library would have them all; second, because, as shown today, there are still unrecorded cases.

THE PREVENTION AND TREATMENT OF SURGICAL SHOCK*

By I. Ridgeway Trimble, M.D.
Baltimore, Maryland

The clinical picture of shock is too familiar to all of us. It is characterized by apathy or torpor, dulling of sensibility, subnormal temperature, irregular, gasping respiration and an excessive lowering of the blood pressure. In addition to the term shock this condition has been variously designated as constitutional alarm, *Erschütterung*, exhaustion, exemia, traumatic torpor, stupor, prostration without reaction, syncope, neuroparalysis, *Wundschreck*, depressant syndrome, traumatic toxemia. Nevertheless, the word shock is as satisfactory as any other, and it is employed almost exclusively in discussing this condition.

Shock follows conditions associated with pain and trauma to the nervous system, or conditions associated with loss of blood and other body fluids, or some form of intoxication. Certain of these conditions are superimposed on one another. A severely burned person suffers first from the initial painful insult, later from loss of fluids, and still later from a severe intoxication. A person who meets with a painful, crushing injury at first feels the effects of the initial insult and later those that are due to loss of fluids from the damaged tissues.

There must, without reasonable doubt, be some relationship between the state of consciousness and the effect of the trauma. Experiencing

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severe pain, or seeing the fresh wound may be additional factors that cause the resulting syncope or collapse called shock. This raises the question whether a person who might go into severe shock or die after a painful injury, such as the crushing of a testicle, would have succumbed had he been under an anesthetic at the time of the injury and, therefore, not able actually to feel the pain. One of the arguments advanced against the view that repeated sensory stimuli cause shock is that in an animal under the influence of an anesthetic some large nerve trunk such as the sciatic may be stimulated over a period of hours without causing symptoms of shock. On the other hand, does it not seem probable that this same animal, when stimulated in the same way, would develop these symptoms provided no anesthetic were given while the painful stimuli were being applied?

The rapid collapse that may appear immediately after some precipitating cause has been called primary shock, and it is customary to differentiate this from the collapse that comes on more slowly, the so-called secondary shock. It seems wrong to look upon early and late, or primary and secondary, shocks as separate entities with different etiological bases. Writers on the subject almost invariably dismiss primary shock with the brief remark that it is probably caused by reflex vagus stimulation and dilatation of the splanchnic vessels causing excessive lowering of the blood pressure. This explanation is founded on the experiments of Goltz, who in 1863 described reflex inhibition of the heart through the vagus nerve and dilatation of the splanchnic vessels when the peritoneal cavity of a frog was opened and the intestines were handled.

That after sudden trauma there follows reflex inhibition of the heart through the vagus nerve with subsequent slowing of the pulse and even cessation of the heart seems quite definitely established. Whether or not the fall in blood pressure can be explained on this basis alone or on that of simultaneous dilatation of the splanchnic vessels, as described by Goltz, is not entirely clear. During the World War no splanchnic dilatation was observed at the time of operation in severely shocked men.

Neurologists describe as shock the condition that immediately follows transection of the lower cervical, the thoracic, or the lumbar region of the spinal cord. The extremities below the lesion are at first flaccid and the deep reflexes lost; later, spasticity develops with exaggeration of the reflexes. This latter type of shock, however, with its gross neurological damage, probably does not belong in the same category with the early or primary shock under discussion.

If a person survives the immediate effects of the trauma, he is then subject to a prolongation of these effects or to additional developments initiated by it. The most serious of these is the abnormal lowering of the blood pressure and the subsequent decrease in the effective blood volume. Among explanations advanced for these complications are inhibition, fat embolism, suprarenal hyperactivity and hypoactivity, acidosis, acapnia, vasomotor exhaustion, vasoconstriction, vasodilatation, toxemia, fluid loss. We shall not attempt to discuss the relative merits of these theories in this paper. At present let it suffice to realize that it is the failure of the circulation with the abnormal lowering of the blood pressure that must be prevented or treated.

The blood is lost not necessarily by hemorrhage; for all intents and purposes it may be just as effectively lost by being accumulated in dilated splanchnic vessels and in greatly dilated capillary beds. When shock has once occurred, and the blood pressure has been allowed to remain even for a relatively short time at a low level, it is often impossible to bring about recovery from this state by any means at our disposal.

"There can be no question therefore about the extreme paralysis of the splanchnic area after two hours' handling of the intestines. There is an absolute paralysis of every tissue of the intestines, of the muscles, of the intestinal walls and of the arterioles. There is an absolute abolition of all reflexes. The great means by which vasomotor changes in the body are possible, that which the vasomotor center uses to produce its rise and fall of pressure and without which it is powerless, is hopelessly unavailable."[1]

Efforts must therefore be made to prevent the occurrence of shock. If these are not effectual, we must do all in our power to prevent its spread and to treat it after it has occurred. Elementary lessons in this connection can be learned from the chronicles of military surgeons. Dominique-Jean Larrey, the renowned surgeon of the armies of Napoleon, was promoted rapidly to attain the high rank of First Surgeon of the Imperial Guards and Inspector General of the Medical Staff of the French *Grande Armée* largely because of his development of the flying ambulance, *l'ambulance volante*. This was made up of mobile hospital units consisting of carriages suspended in such a way as to unite swiftness with solidarity and ease. The ambulance was accompanied by mounted officers and men of the medical staff who went forward with the advanced guard of the army, their duty being to

afford the earliest possible assistance *on* the field of battle. Larrey first established these flying ambulances when serving with the army of the Rhine in 1793, and wrote:

"I now first discovered the inconveniences to which we were subjected in moving our ambulances, or military hospitals. The military regulations required that they should always be one league distant from the army. The wounded were left on the field until after the engagement, and were then collected at a convenient spot to which the ambulances repaired as speedily as possible; but the number of wagons between them and the army, and many other difficulties so retarded their progress that they never arrived in less than twenty-four or thirty-six hours, so that most of the wounded died for want of assistance. This suggested to me the idea of constructing an ambulance in such a manner that it might afford a ready conveyance for the wounded during the battle."[2]

Lessons like this were difficult for our own army to learn. During the war with Great Britain, in 1812-14, there were no ambulance wagons in the United States Army, nor were there any attached to the American Army in Mexico in 1846-48. No organized ambulance corps existed in the United States Army at the beginning of the Civil War, but the necessity of such an organization under the control of the Medical Department was early recognized by the medical officers. On August 21, 1862, Surgeon General W. A. Hammond, U. S. Army, in a letter to the Secretary of War, urged the necessity for such a corps:[3]

"Surgeon General's Office,

"Washington, August 21, 1862.

"Honorable Edwin M. Stanton,

"Secretary of War.

"Sir: In accordance with your verbal permission, I have the honor to submit to you the inclosed project for an Hospital Corps, and to ask your favorable consideration for the same. The plan is merely submitted as a basis on which the corps can be organized; much will remain to be done by regulations, and I propose, should you approve the inclosed outline, to ask for a board of medical officers to perfect the organization. I have not considered it necessary to enter into details; the first thing essential is to obtain your sanction to the organization of such a corps. The need for it is most urgent. In no battle yet have the wounded been properly looked after; men under pretense of carrying them off the field leave the ranks and seldom return to their proper duties. The adoption of this plan would do away with the necessity of taking men from the line of the army to perform the duties of nurses, cooks, and attendants, and thus return sixteen thousand men to duty in the ranks. In view of these facts, and many others which could be adduced, I respectfully ask your approval of the inclosed project.

"I am, sir, very respectfully,

"Your obedient servant,

(Signed) "WILLIAM A. HAMMOND,

"Surgeon General."

To this the following answer was received:

"War Department,

"Washington City, D. C., August 29, 1862.

"Sir: The Secretary of War directs me to acknowledge the receipt of your communication of the 21st instant, submitting a project for a Hospital Corps, and to inform you that the subject was referred to the General-in-Chief, whose views, adverse to the project, are expressed in the following words: 'Our army trains are already much too large and very seriously impede the movements of our troops in the field. The enemy have great advantage over us in this respect. To organize such a medical force as is here proposed would, besides involving enormous expenses, greatly increase this evil. Moreover, the presence of non-combatants on or near the field of battle is always detrimental, as most panics and stampedes originate with them. Medical soldiers would not obviate the necessity of sending fighting soldiers from their ranks with their wounded, for the former would seldom be near enough to the enemy to perform that duty. The soldier can be very much relieved by hiring cooks, nurses, and attendants in hospitals, whenever the circumstances will permit; but I can see no advantage in having them enlisted for that special purpose. All persons so employed are, by law, subject to Army Regulations. I regard this project as one calculated to increase the expenses and immobility of our army by adding to it a large corps of non-combatants, without any corresponding advantages. I therefore report against its adoption.'

"Very respectfully, your obedient servant,

(Signed) "P. H. WATSON,

"Assistant Secretary of War.

"Surgeon General,

"Washington, D. C."

In spite of further appeals to the Secretary of War, no steps were taken in this direction at that time, owing to the opposition of the General-in-Chief, H. W. Halleck. The establishment of a uniform system of ambulance corps in the Union Army was not accomplished until the spring of 1864.

As a parenthetical remark it is interesting to contrast this attitude of indifference with the cooperation shown by Gen. Pershing with the Medical Corps of the American Expeditionary Force. Colonel Hugh Young had among his duties that of control of venereal infection among the troops, and his achievements in this connection were little short of miraculous, but early in his fight he often had difficulty in securing the attention

and cooperation of high ranking commanding officers. The attitude of these officers quickly changed, however, when General Pershing issued General Order No. 77, one of the most notable of army health orders, which ended with the ominous command:

"The venereal reports will be filed at headquarters with the personal reports of organization commanders, and will be used as the basis for determining efficiency and suitability of the officer continuing in command."[4]

In the World War the lesson was relearned, that prevention of the spread of shock is directly proportional to the promptness with which treatment is given. The committee appointed in 1915 to investigate shock in the British Army in its splendid report[5] included such findings as:

"(a) Shock is usually the result of several factors such as hemorrhage, toxins, cold, and anesthetics.

"The effect produced depends on the intensity of each, on the number that are acting at any one time, and on the duration of the period during which they are operative. Any one of these factors, encountered in a moderate degree and for a limited period, can be dealt with by the body. Thus, loss of blood is compensated for by an extraction of the fluid from the tissues; toxic products, provided they are thrown into the body in small amounts, are got rid of. If two occur together, then the effect produced is more than the sum of the two acting separately, and the body has difficulty in righting itself. If to these two factors are added a third, recovery may still be possible. On the other hand, a fatal result may ensue if the body is further taxed by the administration of an anesthetic, which to a normal individual could be comparatively harmless.

"(b) It is important that the patient about to be submitted to an operation should have a reserve of fluid on which he can draw. If fluid is lost, it should be replaced without delay.

"(c) The anesthetic ether, hitherto thought comparatively harmless, may under certain conditions be of great danger to the patient."

The Committee recognized the generally accepted postulate that primary shock is probably nervous in origin and is followed after a definite interval by secondary shock. This latter, within limits, is under the control of the surgeon. The result of this realization was that measures largely confined to the Casualty Clearance Stations were pushed forward to the front line, and the patient was warmed, rested, supplied with fluid in various ways, and much more efficiently splinted. The good results were at once evident.

Ever since the beginning of surgery, efforts have been made to combat the shock that may follow surgical procedures of even moderate magnitude and duration; but the attempts are made almost always after shock has already set in. The primary purpose should be to prevent the occurrence of this shock in so far as this is possible.

Certain measures along these lines are employed by every conscientious surgeon. First of all he must have complete control of hemorrhage. Halsted has said:

"True it is, as I have often said, that the surgeon's method of dealing with the blood vessels is a criterion of his proficience in his art, * * * one of the chief fascinations of surgery is the management of wounded vessels, the avoidance of hemorrhage. The only weapon with which the unconscious patient can immediately retaliate upon the incompetent surgeon is hemorrhage. If he bleeds to death, it may be presumed that the surgeon is to blame; whereas if he died of pneumonia, peritonitis, or other infection, or from an unphysiological operative performance, the surgeon's incompetence may not be so evident."[6]

Other accessory aids in the prevention of shock such as asepsis, gentle handling of the tissues, careful attention to detail, avoidance of fright and of pain, and the choice of an anesthetic are too well known to need discussion here.

There are two controllable factors, however, in the prevention and treatment of shock that are often neglected. The first of these is the body heat lost through sweating and evaporation by a patient while undergoing a major surgical operation. It is a common experience to find the patient at the end of operation in a cold, drenching sweat. Cannon reported:[7]

"That the incidence and severity of shock are in some way related to the coldness of the surroundings of the wounded men seems well established. Members of shock teams working in the A.E.F. during the summer and fall of 1918 reported the strikingly larger number and greater severity of the cases of shock in the cold, wet months of the fall, September and October, as contrasted with the cases seen during the fighting in the warm weather of July and August."

Experiments with the effects of low temperatures show that the blood pressure of an anesthetized animal can be greatly reduced by cold surroundings, and that cooling of the animal, after a slight hemorrhage, results in a fall of pressure which cannot be restored even when the animal is subsequently warmed.

There is every reason to suppose that avoidance of operative shock can be furthered by keeping the patient warm during the entire course of the operation, and experimental work along this line is now being done.

The second controllable factor in the avoidance of shock of which full advantage is not taken by the surgeon is the proper supplying of fluids to replace those lost before and during operation. Preoperatively a patient may be de-

hydrated because of vomiting, high fever, sweating, frequent enemas, and so on. Such a person is a ready victim for operative shock. During the World War men in the trenches with a restricted supply of food and water and little sleep were found to be especially susceptible to shock. In addition to dehydration many patients show preoperative symptoms of pronounced shock: pallor, a cold sweating skin, and a rapid thready pulse. This is true not only of those who have some traumatic injury, but also of those who suffer from such conditions as intestinal obstruction, generalized peritonitis, or perforated peptic ulcers. Even a person in excellent physical condition who is subjected to a prolonged or extensive operation, such as the removal of a brain tumor or the resection of the stomach or the small or large bowel, will necessarily be shocked to some degree by the operation.

In sum, therefore, our problem is that of improving in the best and quickest possible manner the preoperative condition of the patient, and of sustaining the improvement during and after operation. Every effort must be made to prevent the occurrence of shock or to treat it immediately if the patient already has some indication of it when he is first seen. We must not wait until signs of shock develop. Too often is the initial improvement from a single injection of a given amount of fluid seen to disappear as the operation progresses, with resort to the frequent frantic scramble beneath the operative drapings to needle a collapsed vein. The most effective manner in which to meet this problem is by the insertion before the operation has commenced of an intravenous needle or cannula through which fluids are run continuously during the entire course of the operation.

Such a procedure is easily and quickly performed, through the ordinary intravenous needle in the veins in the antecubital fossa or by inserting a small cannula through a small longitudinal incision in the skin into the beginning of the great saphenous vein. (This vein is always constant in its position just above the medial malleolus of the ankle, is superficial, and is out of the operator's way.) The needle or cannula is then connected to a continuous drip apparatus running 45 to 60 drops to the minute.

Normal saline containing 5 per cent dextrose is the usual solution given because of its nutritive, anti-ketogenic and stimulating properties. In cases of acute intestinal obstruction and other conditions associated with frequent vomiting, where there is a rapid loss of chlorides, the dextrose and normal saline solution is supplemented with 1.5 per cent saline solution. Thus the circulation is immediately improved by the addition of fluid and this improvement is maintained, operative shock avoided, acidosis combated, and nourishment given by the continuous drip. Furthermore, by not allowing a patient to become shocked before using restorative measures we reduce both the danger of immediate death from circulatory or respiratory failure and also minimize the frequency of such operative sequelae as bronchopneumonia.

The value of a blood transfusion in shock, especially when it is due to hemorrhage, is unquestioned. Our purpose in these few remarks is merely to stress early treatment or prevention of shock, and this may be greatly aided by introducing a continuous intravenous drip before operation and allowing it to run throughout its entire course.

REFERENCES

1. Janeway, H. H.; and Ewing, E. M.: The Nature of Shock. Ann. Surg., **59**:158-175, 1914.
2. Larrey, D. J.: Memoirs of Military Surgery and Campaigns of the French Army on the Rhine, in Corsica, Catolonia, Egypt, Syria, Etc. Translated by R. W. Hall. Baltimore, 1814.
3. Medical and Surgical History of the War of the Rebellion. Washington, 1883.
4. Young, H. H.: The Venereal Disease Problem in the A.E.F. The Military Surgeon, **78**:1-22 (Jan.) 1936.
5. Reports of the Special Investigation Committee on Surgical Shock and Allied Conditions. London, 1919.
6. Halsted, W. S.: The Effects of Ligation of the Common Iliac Artery. Bull. Johns Hopkins Hosp., **23**:191-220, 1912.
7. Cannon, W. B.: Traumatic Shock, p. 90, 1923.

PSYCHIATRY IN SOUTHERN REGIONS*

By LLOYD J. THOMPSON, M.D.
Yale University, New Haven, Connecticut

Odum,[1] in his recent writings on Southern Regions of the United States, has pointed out the advantage of considering eleven southeastern states as one of six major divisions of the United States. The states included in this "Old South" are Virginia, North and South Carolina, Kentucky, Tennessee, Georgia, Florida, Alabama, Mississippi, Louisiana, and Arkansas. A certain homogeneity based on nearly 200 indices exists in this area and differentiates it from other parts of the country. However, within this large section, state and county lines continue to give local-sectional strivings regardless of good highways and ease of communication.

Odum characterizes the region as one of "superabundance of specific natural resources"

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with "an extraordinary number of those geographic attributes which constitute the optimum setting for economic achievement and cultural adequacy." It should be added that there has been a constant struggle against handicaps and there remains a chasm between the potentialities and the achieved actualities.

The crises or dilemmas that have been faced are more numerous than is commonly recognized. Starting with secession and war there followed a long period of reconstruction complicated by economic and social problems. Agriculture, especially as related to cotton, has faced many crises. Today the situation of the share cropper, the threat of an automatic cotton picker, and the competition of foreign countries are unsettled issues. The industrial growth with its creation of new classes and labor relations adds more complication.

This section remains essentially agrarian with the cultivation of cotton and tobacco as an outstanding characteristic. In recent decades industry has gradually become more important, and in the future may be a more dominant feature than agriculture. The population is composed almost entirely of native whites and Negroes, and the rural population is far greater than the urban. The region is a population producing and exporting center, supplying other parts of the country with many outstanding citizens.

Lately some noteworthy developments have taken place. Many of the states have built extensive and excellent highway systems and several have made progress in public school education that surpasses the progress made in any other region. In numerous subdivisions, social welfare work has been organized in an extraordinary manner. Public health organizations have made great strides not only in combating malaria, pellagra and hookworm, but states and counties have pioneered in the organization of model public health units.

Turning to the question of what has been accomplished in the promotion of mental health and the care of the mentally ill, the answer is far from satisfactory. Here the lag or deficiency stands out along with two or three other items from among all other indices of cultural advances.[2]

Considering first the state hospitals for mental diseases, we find that in many ways the majority of them fall below the average of the country. The number of patients in state hospitals per 100,000 general population and the number of first admissions per 100,000 general population are definitely below the average ratios. To a certain extent this is to be expected in states where the rural population forms a large majority; where a greater proportion of the people are native born; and where almost one-third are below 15 years of age. For example, in North Carolina, a first admission ratio of 56 per 100,000 white population is equivalent to a ratio of over 90 in the white population of New York State. Corrections for age, environment, and parentage account for the difference. A first admission rate of 56 for the white population and a slightly higher one for Negroes should meet the needs for hospitalization in practically all southeastern states, but all of them have fallen considerably below such a ratio in recent years.

It has been proposed that perhaps there is less mental illness in this area of the country, but this cannot be proven. The large number of mental cases in the almshouses and jails which should be added to state hospital populations speaks against such an assumption. In fact, it is possible that the migration of many young adults to other parts of the country may leave a residue of the mentally handicapped. At any rate the proportion of taxpayers is reduced.

Another measure of state hospital efficiency is the quantity of personnel. Quality cannot be

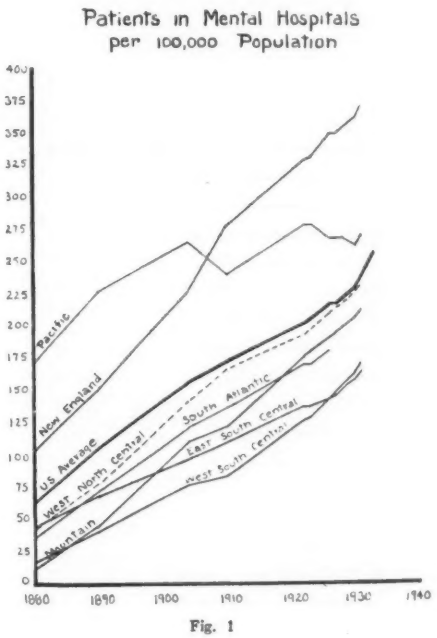

Fig. 1

accurately measured, but it is reflected in some of the quantitative figures, especially when they rank quite low. In number of patients to each assistant physician, to nurse or attendant, or to the total staff, the southeastern state hospitals are below standard, regardless of whether they are for white or Negro patients. These ratios are shown in the accompanying diagrams, which are based on United States Census Reports.

Where there are 500 or more patients to each assistant physician, or about 20 patients to each

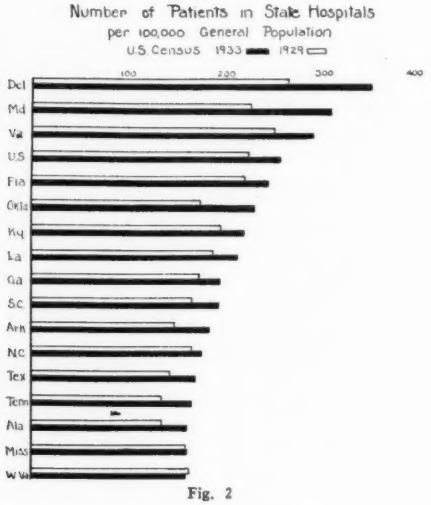

Fig. 2

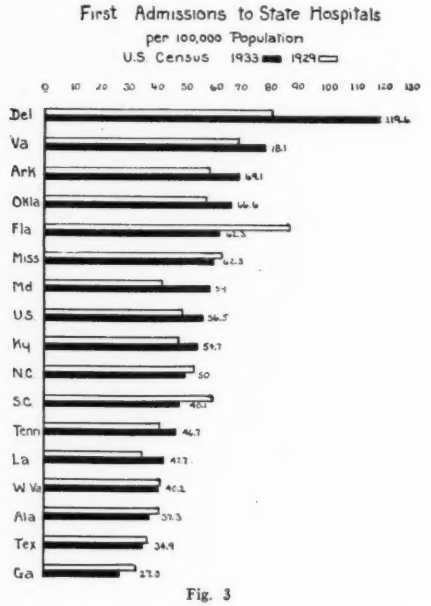

Fig. 3

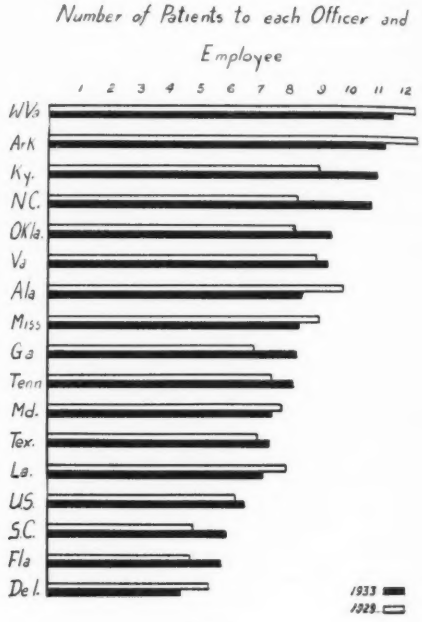

Fig. 4

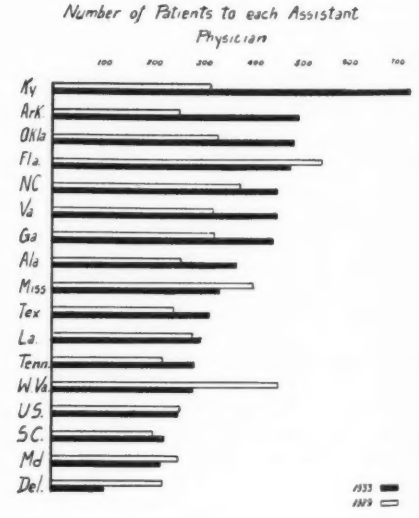

Fig. 5

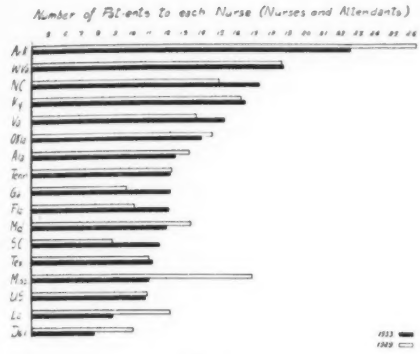

Fig. 6

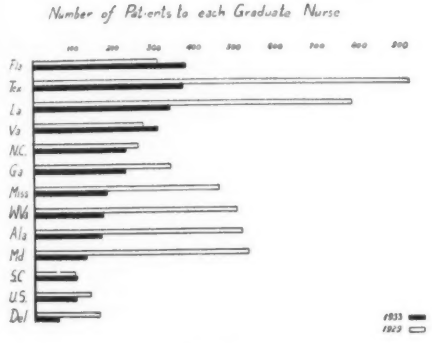

Fig. 7

attendant, the quality of work cannot be high. Another point with regard to personnel is that several hospitals do not have social workers, occupational therapists or hydrotherapists. In fact, only one of the eleven states approximates or surpasses the United States average in all these personnel standards.

A third index of state hospital efficiency and one that is often misused is the per capita cost. It should be understood that when the per capita cost falls below a certain point it is a discredit rather than an honor.

Per capita costs for various southern states are shown in the column diagram. The years 1929 and 1933 are taken as representative of "good times" and "bad times," respectively. Here, too, we find the southeastern states falling below the average for the country and in some instances the figures are less than half of this average. A low cost of living cannot account for this difference.

Many other interesting statistical studies with regard to admissions, recoveries, discharges, deaths, and specific psychoses could be added. For example, syphilis and pellagra, two preventable diseases, are held to account for 14 per cent of all psychoses admitted. However, enough material has been introduced to indicate the lag in making hospital provisions for the mentally sick.

Reference has been made to the presence of psychotic patients in almshouses and jails, but the exact number cannot be given. In almshouses are to be found the psychoses associated with old age, but other psychoses are represented and some of the patients remain for years. In jails many types of mental disease, all age groups and all degrees of severity of illness are represented. The fact that these patients can be cared for more efficiently, more humanely and more economically in state hospitals seems to alter the situation very little.

The first article in volume one of what is now the *American Journal of Psychiatry*, dated July, 1844, says, in part "The county homes are not, however, good places for the insane, as this class of persons requires peculiar care, and we hope the time is not far distant when they will be placed in asylums especially provided for them." Perhaps by 1944 that hope will be realized, but conditions will have to change in many states both within and outside of the southeast before the fulfillment is possible.

All that has been said regarding the psychotic and the state hospitals is applicable to the mental defective and the training schools. None of the southeastern states have provided training school

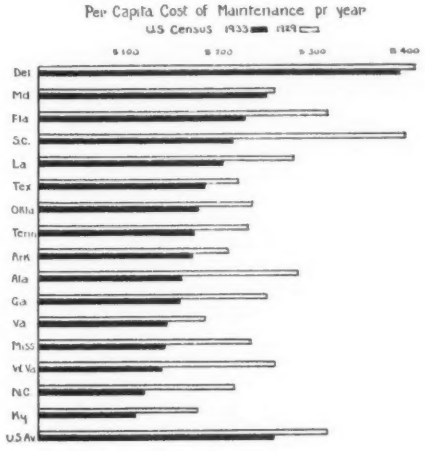

Fig. 8

facilities that meet their needs in this respect. In some instances the training school capacity is less than half of what it should be.

Going beyond the institutions into the communities where the need for psychiatric service is just as great, if not greater, the picture is no more encouraging. In a few states extra-mural work has been undertaken by state hospitals and what they have accomplished indicates the need for further development of such activities. There are only a few large urban centers that can develop their own psychiatric or mental hygiene services. This is one of the important reasons why it is necessary for the states of this region to take considerable responsibility in developing extra-mural mental hygiene activities.

One of the first and most important steps is the organization of traveling out-patient clinics. For the present at least these should be related to the state hospitals if for economic reasons only. The clinic staffs should be composed of psychiatrists, psychologists and social workers who have had training and experience in community work. It is true that the majority of communities are not ready to cooperate in a constructive manner with such clinics, but one duty of the staff would be the education of social and health agencies so that they can cooperate and can bring mental health principles into their own work. These clinics should serve the state hospitals by acting as a clearing house and by supervising paroled patients. Still more important would be their work with mild borderline cases and the more definitely preventive activity of child psychiatry.

That such clinics would save the state money cannot be predicted and cannot be held forth as a reason for their establishment. They should be considered in the same light as a state regards its public welfare and health activities.

For over a decade South Carolina has had excellent clinical service for all of the larger centers of the State, eight in number. The psychiatrist and two psychiatric social workers belong to the staff of the State hospital and are responsible to the Superintendent. The directory of psychiatric clinics compiled by the National Committee for Mental Hygiene lists for the other ten southeastern states thirteen locally sponsored clinics, six Federal clinics and two clinics conducted under state auspices. To complete the mental hygiene picture it should be added that five of the southeastern states have mental hygiene societies.

The establishment of extra-mural clinical service is far from all that is necessary in promoting mental health. The professional workers of the clinic can serve only a small fraction of the people needing help and their educational influence is also limited. One of the most important factors in dealing with mental health or ill health in the future will be an informed medical profession. Nurses and social workers must also be in front line positions. Public health nurses and county welfare workers should assume more important roles in an area where the population is so dispersed. From the standpoint of early contacts, influence and even prevention, the teacher, the lawyer and the minister will have important roles. They are not to be amateur psychiatrists or psychologists, but they should be well informed as to the part they can play in promoting mental health and they should know the limitations of their respective educations and experiences.

The state as well as all private educational institutions should consider what more can be done through education to make the services of all these professional groups more constructive in their contribution to mental health.

Let us consider only briefly some aspects of the education of physicians who in general practice will find in about 40 per cent of their patients the existence of some psychiatric problem. There are thirteen accredited four-year medical schools in the southeastern states. In six of these schools there are separate departments of psychiatry and neurology and in one there is a department of psychiatry. According to 1935-36 catalogues, six schools gave instruction in psychiatry during the preclinical years. The total preclinical hours numbered 94. The total hours required in psychiatry for the thirteen schools averaged 86 per school. The minimum standard of the American Psychiatric Association and the National Committee for Mental Hygiene calls for not less than 150 required hours. This represents about 3 to 4 per cent of the total medical school time. The purpose of requiring as much psychiatric instruction is not to make the medical student a specialist in psychiatry, but is to give a general recognition and application of certain psychiatric principles in all branches of medicine. This should be the keynote of all undergraduate teaching in psychiatry. With regard to postgraduate instruction there is need for at least three centers of psychiatric training that will produce leaders in this field for the South.

Turning to training schools for nurses, social workers and teachers, the same considerations

are applicable. In all such schools some courses in the fundamentals and applications of physical hygiene are given. It is only reasonable to expect that the curricula should contain even more concerning mental hygiene because all these professional people have something to do with the adjustment of human individuals. The need for sound contributions by these allied groups is perhaps greater in the rural southeast than it is in many other sections of the country.

In these brief considerations of psychiatry in Southern regions there has been considerable criticism and little praise. No blame of state hospital superintendents is in order. They have performed their duties extraordinarily well, especially during depression years when legislatures have had to curtail the already meager budgets. There is no desire to place blame elsewhere, but let us hope that criticism like the above will serve to awaken in the medical profession, in legislators, and in the general public a recognition of the needs of the mentally handicapped. They cannot plead their own cause.

Summarizing, the facilities for the care and treatment of the mentally sick and defective should be brought to the level of the average for the entire country, keeping as an ultimate goal the standards asked for by the American Psychiatric Association.

Out-patient clinics should be developed and through them emphasis should be placed on prevention. Physicians, and the people in the allied fields of nursing, social welfare work and teaching, should be trained so that they may make their appropriate contribution to the mental health of the community.

REFERENCES

1. Odum, Howard W.: Southern Regions of the United States. University of North Carolina Press, 1936.
2. Thompson, Lloyd J.: A Mental Health Study of North Carolina. Edwards Bros., Inc., Ann Arbor, Mich., 1936.

DISCUSSION (*Abstract*)

Dr. Geo. H. Preston, Baltimore, Md.—Dr. Thompson has presented a comprehensive review of the status of the mental hygiene program in the Southern states. I should like to reemphasize certain of the points he has made. Dr. Thompson suggested that there might be some difference in the type of patient the Southern hospitals were called upon to care for. A study of the Bureau of the Census report on "Patients in Hospitals for Mental Diseases," 1933, Table 81, which is the last report containing the necessary figures, shows an interesting comparison between various sections of the country. If we take the New England states as one extreme, the Mountain states as another, and compare the percentage of the resident hospital population constituted by certain major psychoses with those in the Southern states, some marked contrasts appear. Dr. Thompson mentioned pellagra and syphilis as causing together about 14 per cent of admissions. Paresis accounts for about 3 per cent of the resident hospital population in New England and about 3 per cent in the Southern states. Pellagra provides about 1.5 per cent of the population in the South and does not occur in the North. That is to be expected. But alcoholic psychoses provide 6 per cent for New England, 1.5 in the mountain states, and about 1.5 in the South. Again that might be explained. It is much more difficult for me to understand why involutional melancholia (so-called) should rate 2 per cent in New England and 0.7 per cent in the South, while psychoses associated with senility and cerebral arteriosclerosis account for an identical 7 per cent in both communities. This is certainly not due to an age difference in the groups, because one would expect patients to pass through the age of exposure to involutional conditions before falling victim to senility. There may be a sex factor involved here. Unfortunately I had no figures available with which to check this point. Why should patients diagnosed dementia praecox constitute 52 per cent of the New England hospital population, 46 per cent of the mountain states' population and only 33 per cent for the Southern states? This situation may be due to the inclusion of a large colored population because, on the basis of the same census report cited above, there is about a 2 per cent difference in first admissions between white and colored patients, dementia precox in the colored for about 20 per cent of first admissions as against 22 per cent for the white. Whatever the cause of these geographic differences, it is obvious that they do exist as Dr. Thompson suggested, and, it seems to me, might well be studied in order to discover whether a mental hygiene program should be differently focused in different parts of the country. Dr. Thompson makes the statement that the situation in the communities outside the institutions is no more encouraging. I believe that I have seen some signs of encouragement but, in order to focus on one of the factors which makes it discouraging at present, I checked the membership of the American Psychiatric Association. In the eleven Southern states cited by Dr. Thompson there were 110 members of the American Psychiatric Association listed in 1936. In one state there was one member. In five of the eleven states there were ten members or less per state. The 110 members for the eleven states should be compared with 137 members in Pennsylvania or 159 in Massachusetts. I do not mean to suggest that the membership of the American Psychiatric Association can be taken as a measure of psychiatric service in any community, but it certainly indicates a lack of organized psychiatry in the area and helps to explain what Dr. Thompson refers to as the need for "an informed medical profession."

I have a firm belief that the physicians in any community have the power to obtain from the community what they believe is necessary for the health of the community. That there is an increasing interest in psychiatry and an increasing demand for psychiatric service cannot be denied. The fact that much of this demand is coming from sources outside the medical profession must serve as a warning to physicians. Progress is, however, being made. The very fact that Dr. Thompson has been making a study of the care of mental patients in a Southern state is one concrete sign. Those of you who attended the Conference on Undergraduate Instruction in Psychiatry held under the auspices of

the National Committee for Mental Hygiene at the Phipps Clinic last April must have come away with a feeling of optimism in regard to the future of psychiatry. Those of you who heard or read Dr. Walter L. Treadway's "Comments on Mental Hygiene Administration" with the statement that "medical leadership is necessary for bringing about those changes" and the hope that the United States Public Health Service would lead the way must have felt that progress was about to be made. I want to reemphasize Dr. Thompson's conclusions that the education of physicians and their professional assistants is the avenue of approach to the problems of mental illness. I believe that beds, per capitas, and clinics will follow that, inevitably and as a matter of course.

A DISCUSSION OF INTRACRANIAL HEMORRHAGE*

By FRANK H. REDWOOD, M.D.
Norfolk, Virginia

Hemorrhage within the cranial cavity is always a serious and often a fatal condition. It is essential first to determine whether or not there is bleeding and then to differentiate, on an anatomical basis, the type of bleeding, so as to institute the proper treatment at the proper time.

This discussion is based upon a study of thirty cases of bleeding within the cranial cavity which are due to trauma. I have included subarachnoid hemorrhage because in some of the cases trauma has been the precipitating factor. I shall analyze the cases by groups and dwell chiefly on the diagnosis. I am not a surgeon and therefore am not competent to discuss surgical technic. In my experience the differential diagnosis is usually quite difficult and a surgical procedure is frequently required to determine the true state of affairs.

SUBDURAL HEMATOMA

In this group were fourteen cases with five deaths, a mortality rate of 36 per cent. All of the patients were operated upon. Several were seen late after the head injury and after intracranial pressure had developed to a marked degree. One patient had pneumonia about the time he was ready to be discharged. There were twelve males and two females and the ages ranged from 17 to 67. There was a history of injury, usually mild, in all patients except one, and the interval varied from two days to one year. For some unknown reason, the clot occurred on the left side in eleven patients, two were on the right side and in one there was a bilateral hematoma. In only five patients were there focal signs sufficient to indicate the side. In five cases there were no focal signs whatever and in four cases the signs found were confusing and on the same side as the lesion. The spinal fluid pressure varied from 52 mm. of water in one case to 570 in another. The fluid was bloody or xanthochromic in nine, and clear in the one case with the pressure of 570. There was no record of the color of the spinal fluid in two and it was not examined in two cases. Mental symptoms of some character or degree were present in practically all cases and the universal complaint was headache. The presence of a fracture was demonstrated by x-ray in only two patients. This is not remarkable, as the injury severe enough to cause a fracture usually does not cause subdural hemotomas. There was a history of alcoholism in three patients, one of whom started to drink because of severe headache. His injury dated back one year. Two patients had a positive spinal fluid Wassermann and had been treated for syphilis. In only one case was Jacksonian epilepsy noted and none had a general convulsion.

The cause of subdural hematoma and the latent period after trauma to the head is not entirely clear. In recent years since neurological surgery has been generally developed, brain operations are every day occurrences, but the operators have paid little attention to the subdural space. Probably the most plausible explanation and the one to which the preponderance of evidence seems to point is that the cerebral veins that cross the subdural space from the dura to the longitudinal sinus are torn by a mild injury to the head.[1] It is well known that frontal or occipital blows are more liable to cause subdural bleeding than a blow on the side of the head. This is due to the cerebral veins running perpendicular into the sinus so that a lateral blow would not be as likely to tear one of these vessels because of the stabilizing influence of the falx.

Gardner[2] explains the latent interval as follows: following cranial trauma a large amount of blood becomes clotted and this clot is surrounded after a few days by a capsule of mesothelium and connective tissue. The encapsulated clot undergoes liquefaction with a resultant fluid high in protein content as contrasted with a low spinal fluid protein and there results an ideal set-up for osmotic interchange which causes a progressive enlargement of the cyst. This explanation

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*Chairman's Address, Section on Neurology and Psychiatry, Southern Medical Association, Thirtieth Annual Meeting, Baltimore, Maryland, November 17-20, 1936.

is further strengthened by his very interesting experiments.

The formation and the pathology of the neomembrane has been fully discussed by Putnam and Cushing[3] and by Munro and Merritt.[4] Munro and Merritt state that the chronic type is only a late stage of an unrecognized acute process.

Certain conclusions can be drawn from the study of these fourteen cases and from a very thorough review of the literature.

(1) Subdural hematoma is not an uncommon condition following a blow on the head.

(2) The most constant symptom is headache.

(3) Mental disturbances are very common.

(4) Pupil changes, signs referable to the pyramidal tracts and hemiparesis or hemiplegia are common signs, but are often not of localizing value and may be confusing. Spasticity of the side opposite the lesion has been a very frequent finding.

(5) The only positive diagnostic procedure is a bilateral trephine in suspected cases.

EXTRADURAL HEMORRHAGE

There were four cases in this series of hemorrhage between the skull and the dura. Three patients recovered and one died, a mortality of 25 per cent. This death should not have occurred. The patient was admitted to the general surgical service and the true condition was not recognized until three days after admission. When the clot was finally removed the compressed brain did not pulsate or expand and the patient did not recover.

Of the whole series of thirty cases, 13.3 per cent represented this type of hemorrhage which would suggest that extradural hemorrhage is an infrequent type of intracranial bleeding due to trauma. In reviewing the literature one is led to believe that extradural hemorrhage is a rather common accident. The cause of the bleeding is rupture of the middle meningeal artery, and when the diagnosis is made operation should not be delayed, as this is one variety of bleeding in which surgery is imperative if the patient's life is to be saved.

The diagnosis of extradural hemorrhage is usually not difficult. Generally there is a history of trauma to the head and in a few minutes to a few hours some degree of unconsciousness with hemiparesis or hemiplegia ensues. Unless the patient is operated upon early, as a rule, the outlook is not very good. This was not true, however, in one of our recent cases. A man was hit on the head by a falling tree one month before admission to the hospital. He was immediately rendered unconscious and had a left hemiplegia. Six hours later consciousness returned, but he was still hemiplegic. Three weeks after this a large extradural clot was removed from the right side and after a stormy few days he completely recovered.

SUBARACHNOID HEMORRHAGE

Of the total series of thirty cases of intracranial bleeding, nine, or about 30 per cent, were subarachnoid, seven of which died, a mortality rate of nearly 78 per cent. It would appear that this type of bleeding is the most serious of all hemorrhages that occur within the cranial cavity.

The consensus of opinion as to the direct cause of subarachnoid hemorrhage is the rupture of a miliary aneurysm. The blood is diffused under the arachnoid membranes and becomes mixed with the spinal fluid. Bagley[5] has shown that if this mixture is rich in blood the symptoms will be profound.

The symptoms in these nine cases were of sudden onset and the patients all complained of severe headache. They presented the picture of meningitis and had varying degrees of loss of consciousness. A history of trauma was not always obtainable. One patient, thinking she might be sick from something she had eaten, induced vomiting. During one of the paroxysms she suddenly had severe headache and in a short time was profoundly unconscious. The ages varied from 16 to 55. Four were females and five were males.

The spinal fluid pressure varied from 150 mm. of water to 600 mm. of water and in all cases the fluid was uniformly bloody, that is, the mixture in the third tube was just as bloody as in the first. The patients that died were the ones that invariably had the richest blood mixture in the fluid.

The diagnosis of subarachnoid hemorrhage, especially in those cases of known trauma, is quite difficult and yet it is most important because the treatment is not surgical unless a diagnosis of clot formation can be made either subdural, extradural or subcortical. In those cases of sudden onset of headache, followed by nausea and vomiting with later varying degrees of unconsciousness, in which the spinal fluid is uniformly bloody, the chances are that the treatment is not surgical.

There has been considerable difference of opinion as to the advisability of repeated spinal

puncture as a method of treatment. Moore[6] believes that blood in the subarachnoid space has an irritating effect and in sufficient quantities is a hindrance to the absorption of cerebrospinal fluid and thereby increases intracranial pressure. Sprong[7] says that blood disappears within five or six days from the spinal fluid in traumatic subarachnoid hemorrhage, and this period is not influenced by repeated lumbar punctures. I am quite sure I hastened the end in one patient by doing a lumbar puncture too early and lowering the pressure too much. Generally I believe a lumbar puncture can be done with safety for diagnosis only in about eight hours after onset. If the mixture is very rich in blood this procedure should not be repeated except where the lowering of intracranial pressure is urgent. This can usually be accomplished by glucose and magnesium sulphate in the vein.

INTRACEREBRAL CLOTS

Very little has been written on traumatic intracerebral clots. In this series there were three cases with a mortality of 33 1/3 per cent. Two were males and one female. None was accurately diagnosed before operation. Two patients were struck on the head and one, a child of 11, fell while playing in the snow. The spinal fluid pressures were all elevated and the fluids were yellow in color. A case is thought to be of sufficient interest both from the diagnostic and the medicolegal standpoints to report in detail.

A colored male of 53 was struck on the head with an iron pipe on March 2, 1936. He was taken to the colored hospital, where he complained of headache, was nauseated with vomiting, but after two weeks he was discharged as recovered. One month later he became drowsy, mentally sluggish and the headache with vomiting returned. A lumbar puncture revealed quite yellow fluid and the pressure was 500 mm. of water. There were no localizing signs, but a diagnosis of subdural hematoma was made and bilateral burr holes were done with negative results. On July 28 a ventriculogram was made which showed no air in the right ventricle and a shifting of the ventricular system to the right. A diagnosis of a left frontal lobe lesion was made, blocking the foramen of Munro, and a left frontal exploration was done, disclosing a small cystic tumor, which was removed and proved to be a degenerated hematoma. Three days later the patient died and autopsy revealed an old blood clot in the right ventricle and a meningioma weighing 125 grams in the left parietal lobe, posterior to the fissure of Rolando. The tumor was adherent to the dura and microscopically contained necrotic areas. The question that the court was interested in was whether the man died of his injury or from the brain tumor. And this we were unable to answer.

CONCLUSIONS

Thirty cases of hemorrhage within the cranial cavity are analyzed, twenty-one of which were due to known trauma to the head and in the remaining nine known trauma was not definitely established. The mortality rate for the fourteen subdural hematomas was 36 per cent, for the four extradural group 25 per cent, the nine subarachnoid cases 78 per cent, and the three intracerebral clots 33 1/3 per cent. The rate for the entire group was 49 per cent, but this is increased by the high mortality of the subarachnoid cases which are apparently the most serious of all types of bleeding within the cranial cavity.

BIBLIOGRAPHY

1. Trotter, Wilfred: Chronic Subdural Hemorrhage of Traumatic Origin and Its Relation to Pachymeningitis Hemorrhagica Interna. Brit. Jour. Surg., **2**:271, 1914.
2. Gardner, W. James: Traumatic Subdural Hematoma, with Particular Reference to Latent Period. Arch. Neurol. & Psychiatry, **27**:4, 847 (April)1932.
3. Putnam, Tracy J.; and Cushing, Harvey: Chronic Subdural Hematoma. Arch. Surg., **11**:3, 329 (Sept.) 1925.
4. Munro, D.; and Merritt, H. H.: Surgical Pathology of Subdural Hematoma Based on a Study of 105 Cases. Arch. Neurol. & Psychiat., **35**:1, 64 (Jan.) 1936.
5. Bagley, C.: The Grouping and Treatment of Acute Cerebral Traumas. Arch. Surg., **18**:1078 (April) 1929.
6. Moore, C. H.: Traumatic Intracranial Hemorrhage. Amer. Jour. Surg., **30**:522, 1935.
7. Sprong, Wilbur: The Disappearance of Blood from the Cerebrospinal Fluid in Traumatic Subarachnoid Hemorrhage. Surg., Gyn. & Obst., **58**:705 (Jan.) 1934.

800 Wainwright Building

THE SURGICAL TREATMENT OF GLAUCOMA*

By ALAN C. WOODS, M.D.
and
EDWARD P. BURCH, II, M.D.
Baltimore, Maryland

The choice of operation in different types of glaucoma is based on the operator's familiarity with different technics, on his experience with the operative complications and the final results of these procedures, and is usually influenced by the opinions and reports of other surgeons. A survey of the literature shows there is no absolute unanimity of opinion as to the operation of choice in different types of glaucoma. Likewise, unless there are full operative notes, and an adequate follow-up system, it is impossible to be sure of the result of one's past experiences. For these reasons, we have adopted the policy

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*From the Wilmer Ophthalmological Institute of the Johns Hopkins Hospital and University, Baltimore, Maryland.

of keeping full operative notes and, when possible, follow-up records of the glaucoma patients operated upon in the Wilmer Institute. These records are analyzed from time to time, that we may determine which procedures in our hands have given the best results. Our impression of the value of various operative procedures, and the studies on which these impressions are based, are the subjects of this report.

METHOD OF STUDY

A special clinic, devoted exclusively to the study of glaucoma, was organized at the Wilmer Institute of the Johns Hopkins Hospital on September 1, 1935. Since that date all cases of glaucoma, when discharged from the public wards, are referred to this clinic for postoperative and follow-up care. These patients are requested to report for observation within the first week after discharge from the hospital and bi-weekly thereafter for a period of several months. If the glaucoma is well controlled at the end of this probationary period, the patients are thereafter examined at three-month intervals.

At each visit the external, ophthalmoscopic, and slit-lamp appearance of the eyes is noted, the vision is recorded, the tension is determined with the tonometer, and the visual fields are charted. Tonometric readings are taken with a specially reserved, constantly standardized Schiötz tonometer. Peripheral field studies are made on the Ferree-Rand perimeter and central fields are recorded on the Ferree-Rand tangent screen attachment. Visual acuity is determined with Snellen charts. Patients are carefully instructed in the proper method of massage of the eyeball, if this procedure seems indicated, and all patients who have undergone any type of fistulizing operation are routinely given a one-fifth per cent solution of zinc sulphate to use three times a day. The close cooperation of a medical social service worker, thoroughly conversant with the ophthalmological and sociological aspects of glaucoma, is a prominent feature of the clinic. Her assistance in the check-up of delinquent patients by means of a card index system is invaluable.

This analysis of cases of glaucoma includes all patients operated upon subsequent to January 1, 1934, who have been adequately followed since the clinic has been in operation. No case is included which has not been followed over at least a six-month period. A total of 108 patients, representing 171 instances of operative interference, are available for this statistical analysis. For the most part the cases under observation are ward patients. The private cases have been included only if sufficient postoperative data is available. This series of patients, therefore, represents a cross section of the various glaucomas observed in an urban clinic. Since the great majority are dispensary patients, the greater number of them are advanced rather than early cases. The following types of glaucoma are represented in this study: acute congestive glaucoma, chronic, primary glaucoma (glaucoma simplex and the chronic, congestive glaucoma of de Grosz), acute and chronic glaucoma secondary to inflammation of the uveal tract, ocular hypertension secondary to thrombosis of the central vein of the retina, buphthalmos, and glaucoma occurring in aphakic eyes.

In this analysis of 28 months' operative experience in glaucoma, we have laid down the following rigid criteria for a "successful result." First, the corrected vision following operation must at least very closely approximate the best vision immediately prior to operation, unless there can be shown to exist a definite cause for the deterioration of visual acuity totally unrelated to the glaucoma or the operative procedure. Second, the field of vision must be maintained at such a point that it compares favorably with the field recorded before operation. Third, the intra-ocular tension must consistently be within the normal range following operation, without the use of miotic drugs. Cases where there has been even a moderate loss of vision, appreciable loss of the visual field, or tension ranging over 25 mm. on the new Schiötz scale are classed as failures.

RESULTS

Acute Congestive Glaucoma.—We have followed a total of fourteen cases of acute congestive glaucoma of the primary type. All of these patients are white. An iridectomy was performed in eight instances and a successful result obtained in seven of these cases. The operation performed was a complete iridectomy save in one case, where a peripheral iridectomy was done. In two cases the eyes were trephined and the operation was not successful in either case. Iridencleisis was done twice and was not successful in either instance. An iridotasis was successful in one or two cases. It is clearly patent that the time-honored and classical procedure of von Graefe has given the best results in acute congestive glaucoma in this small series of cases (*Table 1*).

Chronic Primary Glaucoma.—The largest group of cases fall into the chronic primary glaucoma category. A total of 94 eyes, diagnosed as glaucoma simplex, have been subjected to

Table 1

ACUTE CONGESTIVE GLAUCOMA

All white patients

Type of Operation	No. of Cases	Successful Results		Unsuccessful Results	
		Number	Percentage	Number	Percentage
Iridectomy	8	7	87.5	1	12.5
Corneoscleral trephine	2	0	0	2	100
Iridencleisis	2	0	0	2	100
Iridotasis	2	1	50	1	50
Totals	14	8	57	6	43

Table 2

CHRONIC PRIMARY GLAUCOMA

(Glaucoma Simplex and Chronic Congestive Glaucoma)

Type of Operation	No. of Cases	Successful Results		Unsuccessful Results	
		Number	Percentage	Number	Percentage
White Patients					
Corneoscleral trephine	25	18	72	7	28
Iridencleisis	33	28	85	5	15
Iridotasis	11	9	82	2	18
Totals	69	55	79.7	14	20.3
Colored Patients					
Corneoscleral trephine	10	5	50	5	50
Iridencleisis	8	3	42	5	58
Iridotasis	7	4	59	3	41
Totals	25	12	48	13	52

some type of fistulizing operation. The results of these operations are shown in *Table 2*.

There are 69 instances of fistulizing operations in white persons. A trephine was performed on 25 eyes; a successful result was obtained in 18 instances. Iridencleisis was done in 33 instances with 28 successful results. Iridotasis was performed in 11 instances with 9 successful results.

It is well recognized that the control of glaucoma in the colored race is a difficult problem. It has been our experience that a high percentage of fistulizing operations performed on colored patients fail because of a racial tendency to excessive scar tissue proliferation, which prevents adequate filtration into the sub-conjunctival space. In a few cases an effort has been made to overcome this untoward response of the sub-conjunctival tissues by irradiation of the site of the fistulous tract. This procedure has been carried out in cases of bilateral glaucoma, one eye only receiving irradiation, the non-irradiated eye serving as a control. Too few cases have been studied to permit us to form any conclusion as to the merits of this procedure, but to date the results indicate that it is valueless.

In colored patients a total of 25 eyes with glaucoma simplex have been operated upon. Ten eyes have been trephined, with only 5 successes. Iridencleisis was done 8 times, with 3 successful results. In 2 of the failures the iridencleisis was combined with anterior sclerectomy. Iridotasis was done 7 times, with 3 successes. This shows a sharp contrast when compared to the results in white patients.

When the total number of trephines and iris-inclusions in chronic primary glaucoma are compared, including both white and colored patients, the results show that a successful operative result was obtained in 23 of 35, or 65.7 per cent of trephined eyes as compared with 44 of 59, or 71 per cent of eyes subjected to some type of iris-inclusion procedure.

Acute Secondary Glaucoma.—This term refers to the acute glaucoma secondary to intra-ocular inflammation. Only three eyes under this classification have been followed. The small number of cases in this category is explained by the policy in this clinic of treating the primary cause of the increased tension with the usual local and general measures, and combating the tension with repeated paracenteses of the anterior chamber, both to relieve the secondary glaucoma and to aid the inflammatory process through the mobilization of fresh antibodies in the aqueous. More extensive operative procedures are carried out only if the glaucoma cannot be controlled by this method. Of the three cases of acute glaucoma secondary to uveal inflammation which were operated upon one case was controlled by a broad iridectomy, while two cases were controlled by an iridotasis. The former case was that of a colored patient, while the iridotases were done on white patients.

Chronic Secondary Glaucoma.—This is defined as increased tension in an eye showing evidence of old or active inflammation, manifested by deposits on the endothelial layer of the cornea, posterior synechiae, or the presence of cells in the aqueous humor. This group is second in size only to that of glaucoma simplex. These glaucomas differ from acute secondary glaucoma only in their chronicity. It is quite possible that many cases in this group are in reality glaucoma simplex complicated by chronic uveal disease. In the white race, 7 such eyes have been tre-

phined, with 4 successes. Iridencleisis has been done in 13 instances, with 11 successful results and 2 failures. Iridotasis has been done once only, and this with success. An iridectomy produced a good result in one of two cases. In the colored race a trephine, an iridencleisis, and a cyclodialysis, each failed in one instance, while an iridotasis gave a good result in 3 of 5 cases (*Table 3*).

Table 3

CHRONIC SECONDARY GLAUCOMA

Type of Operation White Patients	No. of Cases	Successful Results		Unsuccessful Results	
		Number	Percentage	Number	Percentage
Corneoscleral trephine	7	4	59	3	41
Iridencleisis	13	11	85	2	15
Iridotasis	1	1	100	0	0
Iridectomy	2	1	50	1	50
Totals	23	17	74	6	26
Type of Operation Colored Patients					
Corneoscleral trephine	1	0	0	1	100
Iridencleisis	1	0	0	1	100
Iridotasis	5	3	60	2	40
Cyclodialysis	1	0	0	1	100
Totals	8	3	42	5	58

Glaucoma Secondary to Thrombosis of the Central Retinal Vein.—The operative results in ocular hypertension secondary to thrombosis of the central vein of the retina have been uniformly unsuccessful. All of the followed cases occurred in the white race. In this series of 9 there were no successful results. Trephines were done twice, iridencleises and iridotases three times each, and an iridectomy once. Most of these eyes were subsequently enucleated because of pain after repeated operative attempts to control the tension (*Table 4*).

Buphthalmos. — In most of these cases the usual criteria for success are not applicable because of the patient's youth. We therefore relied upon instrumental determinations of the tension, usually under a general anesthetic, as a measure of the success or failure of our operative efforts. In white children, a trephine was unsuccessful in 4 cases, an iridencleisis succeeded in 4 of 7 cases, while an iridotasis gave a good result in 1 of 2 cases. In our only Negro patient in this series, an iridencleisis combined with anterior sclerectomy successfully controlled the tension in both eyes (*Table 5*).

Glaucoma in Aphakia.—There are only 3 patients in this category in this series. All patients were white. A trephine brought about a good result in one of the cases, while a cyclodialysis failed in 2 instances. Iridotasis was done twice with a successful issue in both instances.

COMMENT

All operations for glaucoma are primarily designed to lower the intra-ocular tension from its preoperative level. While the intra-ocular tension is far from the whole story of glaucoma, nevertheless a glaucoma operation must be evaluated by the success and permanence of its reduction of tension; by its possible operative and postoperative complications, and by its effect on the glaucoma picture as a whole.

Operations for glaucoma are well classed by Gradle[1] under three heads: (1) operations to increase the normal channels of drainage; (2) operations to establish new channels of intra-

Table 4

GLAUCOMA SECONDARY TO THROMBOSIS OF THE CENTRAL RETINAL VEIN

Type of Operation All White Patients	No. of Cases	Successful Results		Unsuccessful Results	
		Number	Percentage	Number	Percentage
Corneoscleral trephine	2	0	0	2	100
Iridencleisis	3	0	0	3	100
Iridotasis	3	0	0	3	100
Iridectomy	1	0	0	1	100
Totals	9	0	0	9	100

Table 5

BUPHTHALMOS

Type of Operation White Patients	No. of Cases	Successful Results		Unsuccessful Results	
		Number	Percentage	Number	Percentage
Corneoscleral trephine	4	0	0	4	100
Iridencleisis	7	4	57	3	43
Iridotasis	2	1	50	1	50
Totals	13	5	39	8	61
Type of Operation Colored Patients					
Iridencleisis combined with anterior sclerectomy	2	1	50	1	50
Totals	2	1	50	1	50

ocular drainage; (3) operations to provide new channels of extra-ocular drainage. Under these heads they may be discussed. Operations such as paracentesis or posterior sclerotomy, designed to give temporary relief of tension, are not considered in this discussion.

(1) *Operations to Increase the Normal Intra-Ocular Drainage.*—There are three major operations under this head: iridectomy, sclero-posterior iridectomy, and the new operation of trabeculotomy under the gonioscope introduced by Barkan.

The iridectomy was originally introduced by von Graefe in 1856. This operation held supremacy over all others up to the last three decades. It has gradually been superseded by other operations, especially those of Class 3, which provide additional extra-ocular drainage, in all conditions except acute, inflammatory glaucoma. In chronic glaucoma an iridectomy as above does not, as a rule, give either permanent or complete relief. In buphthalmos it has the definite danger that the sudden relief of pressure and removal of a section of the iris may lead to a rupture of the already weakened zonule fibers. In early acute inflammatory glaucoma, it is still the operation of choice. To insure excision of the root of the iris, Reese's[2] idea of undermining the conjunctiva with the keratome before puncturing the anterior chamber is of value, especially if the anterior chamber is of any appreciable depth. The size of the conjunctival flap must be regulated by the depth of the anterior chamber. In extremely shallow anterior chambers it is impracticable to make a large flap.

Strongly as our previous experiences and our results here reported indicate that iridectomy is the operation of choice in acute, congestive glaucoma, nevertheless, when operation must be done after the disease has been established for some days, operations to establish new channels of drainage must be considered. There is a definite tendency for peripheral synechiae to form in the angle after several days of acute, congestive glaucoma, and these may become so dense that it is impossible by iridectomy to remove the root of the iris and open up normal intra-ocular drainage. In such cases, some fistulizing operation or cyclodialysis is the wiser procedure. Our present impression is that an iridencleisis is the operation of choice in those cases of acute, congestive glaucoma operated upon after the disease is well established.

Two other operations to re-establish normal intra-ocular drainage should be mentioned, although we have had no personal experience with either. The first of these is scleral posterior iridectomy introduced by Jervey[3] in 1927. The essence of this operation is opening the eye by a scleral incision 2.5 mm. from the limbus, freeing all peripheral synechiae by passing an iris repositor into the anterior chamber and swinging it to the right and left. The exposed uveal tissue is nicked, a blunt iris hook passed behind the iris, the pupillary edge caught, and the iris withdrawn and excised. In Jervey's hands this operation has given good results, but we have not used it because of the apparent danger, possibly groundless, of injury to the ciliary body.

The second operation is trabeculotomy under the gonioscope, recently brought forward by Barkan.[4] Using a specially modified Koeppe contact glass, under direct gonioscopy, a needle knife is introduced at the limbus, carried across the anterior chamber and the corneo-scleral trabecular pigment band overlying the angle wall is widely incised, thus opening up Schlemm's canal. This operation is manifestly applicable only to the groups of glaucomas with an open angle and would apparently be impossible in any form of congestive glaucoma. Barkan has performed this operation in twenty instances with uniformly good results. It is still too early to express any opinion as to its ultimate merit. This relatively simple procedure, however, may finally prove of the greatest importance and value.

(2) *Operations to Establish New Channels of Intra-Ocular Drainage.*—The one important operation in this class is the well-known cyclodialysis. The usual tendency of American surgeons is to use cyclodialysis as a last resort after other operations have proven of no avail in controlling tension. de Grosz,[5] however, recommends cyclodialysis as the one operation of choice in chronic congestive glaucoma. It must be remembered that de Grosz classifies as "chronic congestive glaucoma" those cases of chronic glaucoma with a history of iridescent vision and transient attacks of mistiness of vision, which on objective examination show a shallow anterior chamber and a dilated pupil, reserving the term "glaucoma simplex" for those cases of chronic glaucoma which have no history of iridescent vision or transient attacks of misty vision, and which on examination show normal anterior chambers and normal pupils. In one thousand consecutive cyclodialysis operations done on such cases of chronic, congestive glaucoma, de Grosz reports immediate good results in 87 per cent, with 62 per cent good results at the end of one year, 54 per cent good results at the end of two years,

and 50 per cent permanently good results at the end of five years. He has never seen either sympathetic ophthalmia or infection follow this operation. Bunge[6] reports equally good results. Gradle[1] believes that cyclodialysis finds its happiest results in cases of compensated glaucoma just beyond control by miotics. In such cases of "compensated" glaucoma Gradle follows the older and usual classification, including both the "chronic congestive glaucoma" and the "glaucoma simplex" of de Grosz. In such properly selected cases of glaucoma, Gradle reports 75 per cent successes. Should the first attempt not give a successful result, cyclodialysis can be repeated time and again on the same eye in different locations without harm. Reese[7] calls attention to the danger of the iris spatula's perforating the iris in cases of glaucoma with a shallow anterior chamber and broad peripheral synechiae.

In the Wilmer Institute we have not employed cyclodialysis to any extent as a routine initial operation in early glaucoma, either of the chronic congestive or glaucoma simplex types (de Grosz). It has been used extensively in glaucoma of various types in which other operations, iridectomy and fistulizing operations have failed. Our usual experience has been that it gives an immediate satisfactory result, but with a period varying from twenty-four hours to one week the tension rises, the drainage into the suprachoroidal space apparently being blocked off. Gradle[1] believes this occurs because the initial intra-ocular pressure was originally too high to be cared for by drainage of the aqueous into the suprachoroidal space, and the tension returning with the secretion of fresh aqueous forces the choroid against the sclera and closes the suprachoroidal space again. The operation is singularly free of complications, with the exception of anterior chamber hemorrhage. We have not encountered the technical difficulty of the spatula's perforating the iris, emphasized by Reese.

Since peripheral synechiae at the angle constantly occur in the chronic congestive glaucomas, the logic of cyclodialysis in such cases is apparent. Not only should the operation provide new channels of intra-ocular drainage, but it should also free a portion of the angle.

In view of the encouraging results in early glaucoma reported by de Grosz and other European ophthalmologists, and the confirmation of their results by Gradle, it appears that this relatively simple and benign operation merits a wider application in early glaucomas than has been given it by American surgeons.

(3) *Operations to Promote New Channels of Extra-Ocular Drainage.*—There are a number of these operations, all looking to procuring a filtering scar and allowing the aqueous to filter from the anterior chamber to the subconjunctival space for absorption. LaGrange[8] brought forward the sclerectomy with iridectomy in 1906, the principle being to excise a wedge of sclera and promote the formation of a filtering cicatrice. Synchronous with this was Herbert's[9] wedge sclerectomies, followed by a number of modifications by various authors, including sclerectomy by punches. In 1907 Holth[10] approached the problem of the production of a filtering cicatrice by the operation of iridotasis, the subconjunctival incision of the iris tissue in a corneoscleral wound. This was later modified into an iridencleisis, a similar procedure except that the sphincter of the iris was cut through. In 1909 Elliott[11] introduced the corneoscleral trephine, the basic idea of which was to trephine a subconjunctival opening at the corneoscleral margin, as far forward as possible, remove the corneoscleral disc, do an iridectomy, either peripheral or including the sphincter, and so establish communication between the anterior chamber and the subconjunctival space.

LaGrange operation has been used extensively. While in many American and European clinics it is still a routine procedure in certain glaucomas, in general it has been superseded by other procedures, notably, trephine and iris inclusion operations. The usual objections to the LaGrange operation are: (1) the large size of the incision; (2) the difficulty in regulating the amount of sclera to be excised; (3) the dazzling resulting from the operation; and (4) the postoperative astigmatism. In our opinion the second point is most important. If the scleral wedge is insufficient in size the excised portion may not reach to the posterior surface, the conjunctiva smoothly covers the cicatrice and no drainage results. If it is too large, especially with a high tension and anteriorly placed lens system, a partial herniation of the ciliary body may result. Since all, or nearly all, the good features of the LaGrange operation can be obtained either by a trephine or iridencleisis, these iris-inclusion operations have largely supplanted the LaGrange operation.

The corneoscleral trephine was originally used routinely in the Wilmer Clinic for glaucoma simplex, including in this category the chronic congestive glaucoma as defined by de Grosz.

During the last three years, however, we have inclined more and more to iris-inclusion operations, until now this type of operation is performed in the greater number of non-inflammatory glaucomas. The chief reasons for this change have been the danger of late postoperative infection, the inadequacy of the corneoscleral trephine in certain types of glaucoma, and the greater frequency of operative and postoperative complications in trephine operations as compared with iris-inclusions.

Late infection has always been the most feared complication in trephined eyes. If the trephine opening remains open the interior of the eye is protected against invading bacteria only by the overlying conjunctiva and episcleral tissue. In some patients a fairly thick protecting flap is obtained. In others there is only a thin conjunctiva. Dr. Wilmer[12] sought to give added protection to this last group by the insertion of a small flap of Tenon's capsule over the trephine opening beneath the conjunctival flap. At first this appeared to be a successful procedure, but later observation of these patients has shown a general tendency for the Tenon's capsule graft to plug the trephine opening, with a return of the tension. While a Tenon's capsule graft may thus give added protection against late infection, it tends to defeat the aim of the operation. Late infections may come on from months to years after a most successful operation. A few such disasters, utterly beyond the control of any surgeon, are enough to discourage one's enthusiasm, and we frankly feel that in our total experience with trephines there have been too many late infections.

The second objection to corneoscleral trephines is that frequently the most carefully performed and best technical operations will not give a permanent filtration. Especially does this seem true in glaucomas with shallow anterior chambers, with a history of iridescent vision, the chronic congestive type of de Grosz. In these patients the lens system is displaced forward. When these eyes are examined histologically the ciliary body and processes are usually displaced forward with the lens system. When such eyes are trephined they at first do well. However, the relief of pressure in the anterior chamber appears to accentuate the forward displacement of the lens and ciliary system and the trephine openings become blocked by uveal tissue. This is shown by the histological studies of Reese.[13] Further trephines on such eyes are useless and we are forced over to cyclodialysis or some combination of other operations. We believe the corneoscleral trephine finds its maximum usefulness in simple non-congestive glaucoma, where the anterior chamber is normal in depth, where there is no history of iridescent or misty vision, and where there is a reasonably thick conjunctival and episcleral flap.

The principle of the iris-inclusion operation is the inclusion of the pigment layer of the iris in the lips of the sclera to prevent complete closure of the wound and to allow subconjunctival filtration along the path of the included iris. The deliberate inclusion of such a delicate tissue as the iris in a scleral wound appears a most unsurgical procedure and one calculated to be followed by a host of evils, postoperative iritis and cyclitis, late infection, and possibly even sympathetic ophthalmia. When at last, discouraged by the late infections in trephines, we began to practice this operation, these fears were not realized, and to date we have found the results gratifying. We have used simple iridotasis, and several modifications, drawing the iris out by the pupillary border, thus inverting it and creating a funnel of incarcerated iris. Unless the iris is pulled well into the wound and the pupil displaced upward, there has been in many cases a tendency of the iris to retract from the scleral inclusion, nullifying the effects of the operation. For this reason we now do a simple iridotasis only on eyes already iridectomized, and on arteriosclerotic individuals where undue hemorrhage is feared on cutting the iris. In the average case we prefer an iridencleisis, cutting through the sphincter of the iris and laying the two pillars of the iris flat in the scleral wound.

There is surprisingly little reaction to iris-inclusion operations and convalescence is usually rapid. There is a notable absence of postoperative cyclitis. Detachment of the choroid occurs at times, but no more frequently than in trephines or cataract operations, and it always corrects itself without treatment. The anterior chamber is sometimes unusually slow in reforming, but to date this has been a harmless and uneventful complication. The operation appears to work equally well whether the anterior chamber is normal or shallow. Late infections have so far been conspicuously absent. If drainage is established, it appears to be reasonably permanent. Gentle massage of the eye is often necessary after iris-inclusion operations fully to establish the subconjunctival drainage. This is usually instituted on the third or fourth day after operation and, if there is any tendency for the tension to rise, may be continued indefinitely. We have seen several cases where the tension

rose again a few days after operation, only to fall to a low normal under massage and after a few weeks of massage twice daily to remain at a low level without further treatment.

There is a class of glaucomas which appears to be beyond the reach of any of our present operative procedures. First of these are the glaucomas secondary to thrombosis of the retinal veins. In our experience all operative procedures, iridectomy, cyclodialysis, trephine, and iris-inclusion operations, have been equally unavailing in controlling these glaucomas secondary to venous thrombosis. We view these cases with utter despondency.

Malignant glaucomas and severe glaucomas, when technically correct operations of whatever type have failed permanently to control the tension, present an especial problem. In these patients the initial fall of tension following operation soon disappears, the trephine openings and iris-inclusion cicatrices fail to drain and the increased tension returns. Further trephines or iris-inclusion operations result in the same picture. Cyclodialysis gives only temporary relief. These intractable glaucomas, as shall later be pointed out, are more common in Negroes. When multiple operations, trephines and iris-inclusion operations fail to control the tension, we have resorted to combinations of operations, two trephines side by side with the excision of the scleral bridge between, and cyclodialysis plus iridectomy as recommended by Wooton[14] and Wheeler.[15] The results of such procedures have only occasionally been successful. In many of these cases the lens is partially cataractous, swollen, and displaced forward with resultant pressure on the angle. In such patients there is no alternative other than removal of the lens. This is always a dangerous procedure with an elevated intra-ocular tension. The sudden ciliary edema resulting from the abrupt reduction of tension is often more than the eye can tolerate, and these eyes sometimes go directly into phthisis. However, if the lens is left *in situ*, no operation can permanently reduce the tension. In short, if properly done iris-inclusion operations and corneoscleral trephines over a site well removed from the previous operation fail to control the tension, the prognosis in our experience has been serious.

Although the total number of cases operated upon in this series is small, it is interesting to compare the corneoscleral trephine with the iris-inclusion operations with respect to the operative, postoperative and late complications. From January, 1934, to May, 1936, a total of 95 trephines and 170 iris-inclusion operations were performed in the Wilmer Institute. These totals include both private and public ward cases. This includes many cases not followed in the glaucoma clinic and not included in the preceding analysis for the reason that we have no follow-up notes after discharge from the hospital. In the 95 trephine operations the following operative complications were noted. Hemorrhage from the iris occurred in 10 instances and the scleral button was lost in the anterior chamber upon one occasion. In 170 iris-inclusions there was hemorrhage into the anterior chamber in 9 instances, the iris pillars retracted into the anterior chamber in 2 instances, and there was severe intra-ocular hemorrhage with loss of the eye in one instance.

With respect to immediate postoperative complications, during which time the patients were under observation in the hospital, the advantages of the iris-inclusion operation are even more striking. In the series of 95 trephined eyes there were three traumatic cataracts, 12 instances of anterior chamber hemorrhage, 4 cases of postoperative cyclitis, 2 sudden rises in tension which necessitated immediate operative interference, and one instance each of choroidal detachment and retinal detachment, 3 instances of postoperative infection of varying severity, and one instance of retinal hemorrhage.

In comparison, in the 170 iris-inclusion operations the following postoperative complications were noted: anterior chamber hemorrhage 5 times, traumatic cataract twice, choroidal hemorrhage once, and choroidal detachment 3 times (*Table 6*).

There are no instances of late infection in either the trephine or iris-inclusion series, although in the trephine series there were 3 early postoperative infections. Sympathetic ophthalmia has been mentioned as a constant danger in iris-inclusion operations, but it has not occurred in any of our cases. Another late development which has received relatively little attention is hypotony with the formation of central, nuclear lens opacities. Our present series of cases has not been observed over a sufficiently great length of time to permit observation upon this score, but it may be significant that the average tension in controlled cases operated upon one year or over is definitely lower in eyes which have

Table 6

COMPARISON OF THE CONREOSCLERAL TREPHINE AND IRIS-INCLUSION OPERATION WITH RESPECT TO COMPLICATIONS

Type of Operation	No. of Cases	Operative Complications		Postoperative Complications	
Corneoscleral trephines	95	Anterior chamber hemorrhage	10	Traumatic cataract	3
		Loss of scleral button in anterior chamber	1	Anterior chamber hemorrhage	12
				Postoperative cyclitis	4
				Sudden rise of tension	2
				Choroidal detachment	1
				Retinal detachment	1
				Postoperative infection	3
		Total	11	Total	26
			or 11.5 per cent		or 27.3 per cent
Iris-inclusion operation	170	Anterior chamber hemorrhage	9	Traumatic cataract	2
		Retraction of iris into anterior chamber	2	Anterior chamber hemorrhage	5
		Expulsive choroidal hemorrhage	1	Choroidal hemorrhage	1
				Choroidal detachment	3
		Total	12	Total	11
			or 7 per cent		or 6 per cent

been trephined than in those which have been subjected to some iris-inclusion procedure. In 18 trephined eyes the average tension is 18.8 mm. mercury Schiötz, as compared with 21.0 mm. mercury in 35 eyes operated upon by the iris-inclusion method.

It therefore seems justifiable to conclude, on the basis of this rather limited series of cases, that the iris-inclusion type of operation is attended with less operative risks, a lesser number of immediate postoperative complications, and fewer potential late complications than the corneoscleral trephine of Elliott. It is hoped that through continued study more extensive and significant conclusions can be reached upon the operative management of all types of increased intra-ocular tension.

BIBLIOGRAPHY

1. Gradle, H. S.: A Critique of Glaucoma Operations. Amer. Jour. Ophth., **18**:730, 1935.
2. Reese, R. G.: Technic of Iridectomy Done Under a Conjunctival Flap for Glaucoma, Using a Broad Keratome. J.A.M.A., **82**:614, 1924.
3. Jervey, J. W.: Sclero-Postiridectomy, a Rational Operation in Glaucoma. Amer. Jour. Ophth., **11**:7, 1928.
4. Barkan, O.: Tr. Academy Ophth. & Oto-Laryngology, 1936. In press.
5. de Grosz, E.: Uber Glaukom - Operationen. Wien. med. Wchnschr., **85**:312, 1935.
6. Bunge, E.: End Results After Cyclodialysis. Klin. Monatsbl. f. Augenh., **90**:21, 1933.
7. Reese, A. B.: The Pathology of Chronic Simple Glaucoma. N. Y. State Med. Jour., **33**:1428, 1933.
8. LaGrange, F.: Iridectomie et Sclerectomie Combinees dans le Traitement du Glaucome Chronique. Arch. d'ophth., **26**: 481, 1906.
9. Herbert, H.: Operations for Filtering Cicatrices. The Ophthalmoscope, **6**:483, 1908.
10. Holth, S.: Iridencleisis Antiglaucomatosa. Ann. d'ocul., **137**:345, 1907.
11. Elliott, R. H.: A Preliminary Note on a New Operative Procedure for the Establishment of a Filtering Cicatrix in the Treatment of Glaucoma. The Ophthalmoscope, **7**:804, 1909.
12. Wilmer, W. H.: Discussion on the Results of Operative Treatment of Glaucoma. Tr. Ophth. Soc. U. K., **47**:230, 1927.
13. Reese, A. B.: The Ciliary Processes and Their Relation to Intra-Ocular Surgery. Tr. Sec. Ophth., A.M.A., p. 262, June, 1933.
14. Wootton, H. W.: Cyclodialysis Combined with Iridectomy in Glaucoma Simplex: A Preliminary Report. Tr. Amer. Ophth. Soc., **30**:64, 1932.
15. Wheeler, J. M.: Iridectomy with Cyclodialysis for the Reduction of Ocular Tension. Arch. Ophth., **16**:569, 1936.

THE SURGICAL CONSIDERATION OF THE TYPHOID CARRIER*

By FRANK S. LYNN, M.D.
Baltimore, Maryland

Typhoid fever has long since ceased to be an epidemic disease due to our improved sanitary supervision and the widespread practice of inoculation. The problem of it now being an endemic disease is well worthy of our attention from the economic as well as from the medical point of view. Indifferent, indeed, must be the medical man or surgeon who is not fascinated by the interesting story of "Typhoid Mary" as told by Dr. George A. Soper. No doubt such a story could be repeated by others.

The object of this short discussion is, therefore, not to offer anything new, but to make a

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plea to lend our efforts to the further eradication of this disease and at the same time bring happiness and usefulness to that unfortunate individual, the typhoid carrier. Some of you will no doubt be surprised when I tell you that in this small State of ours with a million and a half population divided into twenty-three counties and the City of Baltimore, there are approximately one hundred and fifty-eight individuals who are potential sources of infection, and to these carriers a total of six hundred and twenty-seven cases of typhoid fever can be attributed. All of these one hundred and fifty-eight carriers were proven to be so by bacteriological examination. It also is interesting to note that a housewife who had typhoid fever was found to be a carrier eighteen years later and that one hundred and six cases of typhoid fever were traced to this woman. None the less interesting is the fact, that an individual may be a carrier and a potential source of danger without ever having had the disease. This fact adds to our difficulty in the proper management of this group of individuals, as it is not common for these people to suffer because of their being carriers. What, then, are we to do when a carrier is discovered, to return this potentially dangerous man or woman to a gainful occupation and to normal pursuits?

Over a long course of years the use of intestinal and urinary antiseptics has proven inadequate. It is true that some of the cases were freed of their danger by the use of these agents, but because of the remote habitat of the bacillus in most individuals, they were useless. The procedure of the health departments of some cities and states, among which Baltimore and Maryland are included, is to determine the focus of infection; then it is of the utmost importance to determine whether the typhoid bacilli are present in the bile. "To determine this three specimens of duodenal contents taken on different days by means of a duodenal tube shall be obtained before considering" any operative procedure, "unless the first or second specimen is reported positive. A specimen of liquid feces is taken on each day following the taking of a duodenal specimen. A positive fecal specimen with negative duodenal specimen is a clear indication of an intestinal focus." Quite recently Gulbrandsen in the *Illinois Medical Journal*, March, 1935, advocated the use of x-ray over the hepatic region with 33 1/3 per cent complete successes in eradication of the bacillus.

In the past several years the health department of this State has increased its activity in endeavoring to solve the problem of the typhoid carrier. When used medicinal agents have been employed over a reasonable length of time with no result, the surgical management of these persons is advocated.

SPECIMENS TO BE SUBMITTED AT TIME OF OPERATION

"If typhoid bacilli are found in the duodenal contents before operation, the following specimens shall be secured at the time of operation and submitted to the laboratory in special containers designated for each kind of specimen."

(1) The gallbladder and its contained bile.

(2) The appendix, if this be removed.

Following is the interpretation of laboratory reports: "A negative gallbladder would imply an intestinal carrier. A positive appendix might indicate either that it was the sole focus of infection or that an additional focus might also exist above it. Intestinal carriers are apparently rare (1 out of 164 of Garbat's cases). The typhoid bacillus was isolated from the appendix of 5 out of 17 chronic carriers operated upon in New York State for removal of the gallbladder and appendix, for which laboratory reports were available."

"When sending specimens to the laboratory do not employ a fixing solution for tissues submitted for examination. This has been done in some cases and the specimens were rendered worthless for bacteriological examination."

"The surgeon should be especially instructed that it is very important that the required anatomic specimens removed at operation be placed immediately in separate jars. This is necessary in order to guard against the possibility of the specimens' being handed to an uninstructed nurse who may place them in the usual fixitive solution for pathological specimens. If such an accident should occur it would interfere with the subsequent bacteriological examinations and make it difficult to decide on the safety of removing carrier restrictions, which is the purpose of the entire operation."

The very encouraging reports of Whipple (1929), Southwood, Thomas and Knight (1931), Bigelow and Anderson (1933), Hanssen (1935), and Labsenz (1936) have influenced our health authorities to seek the cooperation of surgeons in carrying out that operation which has proven up to the present time most efficient, namely, cholecystectomy. This operation even in this type of case is not new, as it was first done by Dehler in 1907 after partial success had been obtained by Blumenthal in 1904 by simple drain-

age of the gallbladder. Although most of these persons suffer little or none, the results following cholecystectomy have been sufficiently encouraging and the evidence of definite pathology at operation so constant as to justify us in recommending this operation, provided we have waited a sufficient length of time following the attack of typhoid fever, and that it has been proven that the gallbladder harbors the typhoid bacillus, and that the condition of the person justifies cholecystectomy. The greatest difficulty encountered by the health authorities is persuading these carriers to submit to surgery, because most of them feel well and present no subjective symptoms. It is hard, therefore, to convince them such an operation would benefit other people. So, like all other health measures, it resolves itself into a campaign of education.

In reviewing the results obtained by the various writers on this subject, one is struck by the uniformity of success, all recording 80 to 85 per cent cures of the individuals submitting to operation. Because these people are a health menace and should not engage in many occupations, some states pay them a subsidy. Thus we see the economic side of the problem is of considerable importance to the community. The number we are able to cure, therefore, means a considerable saving to various states, and more important, it means the removal of the source of spreading typhoid fever. It behooves surgeons to cooperate with the health authorities in this important matter and thereby make a substantial contribution to preventive medicine.

BIBLIOGRAPHY

1. Soper, George A.: Military Surgeon, July, 1919.
2. Whipple, A. O.: Annals of Surgery, Oct., 1929.
3. Zorn, D.: Grenzgeb. d. Med. U Chir., **42**:550, 1931.
4. Johnston, T. H.: Jour. Med. Ass. Ga., **20**:213-215 (June) 1931.
5. Onodern, U.; Murakawa, G.; and Lin, S.: Deutches Archiv. fur Klinische Medizin, **171**:503, 1931.
6. Gutfeld, F. V.: Deutsche Medizinische Wochenschrift, **57**:274 (Feb. 13) 1931.
7. Southwood, A. R.; Thomas, E. B.; and Knight, R. B.: Med. Jour. Australia, **2**:541-543 (Oct. 31) 1931.
8. Lyon, B. B. V.: J.A.M.A. (March 12) 1932.
9. Jones, J. L.: Sou. Med. Jour., **25**:416 (April) 1932.
10. Knight, N. C.: New Orleans Med. & Surg. Jour., **85**:662 (March) 1933.
11. Bigelow, Geo. H.; and Anderson, Gaylord W.: J.A.M.A., (July 29) 1933.
12. Gulbrandsen, Lars: Ill. Med. Jour. (March) 1935.
13. Hanssen, Eilip Carl: N. Y. State Jour. of Med., **35**:1206, (Dec.) 1935.
14. Lobsenz, J. M.: Med. Rec., Aug. 19, 1936.
15. Riley, Robert H.: Maryland State Department of Health. Personal communication.
16. Riley, Robert H.: Bull. Md. State Dept. of Health, July, 1936.
17. Halliday, C. H.: Maryland State Department of Health. Personal communication.
18. Weinzirl, A.: Baltimore City Health Department. Personal communication.

THE SPA TREATMENT OF ARTHRITIS*

By W. T. Wootton, M.D.
Hot Springs National Park, Arkansas

"Until recently, the history of rheumatism in general, and of acute articular rheumatism in particular, has been nearly stationary. We may find in the writings of a few some positive ideas on causes, nature and treatment of articular rheumatism, which certain modern classical physicians have entirely misunderstood. Who would believe, for example, that it were possible for anyone in our times to carry false observations so far as to proclaim that specifically cited causes have but little to do in the production of acute articular rheumatism?"

The above was written a hundred years ago during a period when criminations and recriminations were hurled to the high heavens over the cause and most effective method of treating arthritis in both the Parisian Academy of Medicine and the Viennese. With amazingly slight changes it might well reflect the sentiment of many present day observers. However, since the day of Bouillaud, blood chemistry has superseded blood letting; bacteriological research has afforded us information that supplants climatological changes as a causative agency, and between the two we have been let in for many and varied theories based upon these findings. The Englishman (Haig) probably sold his fallacious uric acid theory to a larger following than any other worker with the possible exception of Billings, who gave us the commendable focal infection doctrine.

Today we have among us groups of serious minded workers just as strongly divided as to cause, relationship of the atrophic to the hypertrophic and other pertinent phases of arthritis as were the gentlemen of Paris and Vienna a century gone.

Nevertheless, we have made noteworthy advancement in our knowledge of the various morbidities which result in the arthritic joint. Of course there are many phases of this mooted process that are by no means clear to us. So eager are we to find a direct answer to this problem, one wonders if we interpret properly those things which have so far been made clear through patient research.

Before it is possible properly to evaluate any agency for the alleviation of an unnatural condition it is encumbent on us to clarify our theory

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as to its cause. Without some theory to account for the arthritic process, we are in no way better prepared to combat the disabling effects than were our blood letting forebears. Therefore I ask your indulgence in order to outline briefly an interpretation of the facts thus far developed by others.

To begin with, this theory contemplates that it may not be possible to take from or add to the calcium content of an articulating end of a bone while its synovia is in a normal state.

It follows that possibly every calcium change that takes place in a joint is preceded by a trauma.

Now, this trauma may arise from a single concussion or from multitudinous slight injuries; or it may not be from a concussion at all, but an injury from an anaphylactic reaction against unsplit proteids emanating from either the bacteria in a focus of infection or from food ingested.

An allergic person may be subject to recurrences of pain and possibly calcium changes as often as the offending allergen is introduced into the circulation.

Whatever the nature of the trauma, there is produced in the joint an edema of the synovia, be that edema massive enough to submerge the patella or diminutive enough to cause only stiffness or a dull ache in a phalangeal or vertebral articulation. It has not been shown that either a traumatic or an allergic injury to the joint will, of itself, cause a calcium disturbance in that joint other than a healing process. But should there occur a calcium hunger in the blood serum during the time this joint is boggy and without normal protection, the serum will absorb the calcium needed to meet its demands, from the most accessible point.

Serum hunger for calcium is regulated by the parathyroids. Various other glandular disturbances or imbalances may influence the parathyroids unfavorably, but they have never been shown to act directly on the calcium content of the serum. Other food elements, such as phosphorus and vitamins, also have an indirect influence on the elaboration of parathyroid secretion.

In order to tie in the atrophic and hypertrophic types as end results of the same process, it is necessary to visualize the stream of calcium to or from the joint surface as being more or less constant during the active stage, but in such minute quantities that no apparent change in the total serum content may be found. A patient whose normal calcium average is 9.5 mg. per 100 c. c. of blood may run 10 mg. over a period of years, resulting in decided deformity of his joints. His blood calcium is normal, but he is shifting his lime, nevertheless.

Just so long as there is edema of a joint, there is danger of a calcium disturbance with resulting deformity.

Whether the calcium flow be directed to or from an unprotected articular surface may depend upon the demand for the content of the blood serum at that time. Calcium absorbed in excess of normal metabolic needs in early life may be eliminated through the urinary channels as quickly as the demand is made. In later life, through and past middle age, the kidneys are less permeable to the various metals and the serum holding an excess over its physiological normal may dump it at the most receptive site. A joint continuously traumatized by excessive weight-bearing is always in a receptive mood.

One of the first noticeable results of an edematous or painful joint is nature's effort to immobilize it, with grotesque posturing and varying deformities resulting therefrom. The second is an atrophy of those groups of muscles not involved in the spasticity.

Regardless of whether we believe that the atrophic and hypertrophic types of chronic arthritis are the end results of one and the same process, or that they bear no causal relationship to each other, whether we think an as yet undiscovered streptococcus is the sole cause of all acute joints or that all streptococci may cause some edematous joints; whether there be a mysterious rheum circulating in the blood of the arthritic that settles in the joint and destroys it, our earliest conception, apparently still tenable for many, or whether we agree that arthritis is a dual process dependent primarily on an edema of the articulating surface and secondarily on the appetite for calcium of the blood serum, I repeat: regardless of the theory as to how and why calcium is abstracted from or deposited in a joint, it would be perfectly asinine to assume that hydrotherapy, however well applied, might stem the tide of the shifting sands. And now the role of the spa.

The spa treatment of arthritis is aimed at the relief of peri-articular results of the arthritic process, and not of the conglomerate morbid states making up that deformity.

Individual physicians have their own methods of dealing with or letting alone the arthritic process *per se*, but when it comes to the relief

of its results, we are probably more uniformly agreed as to the efficacy of heat and guarded manipulations applied to the affected joint. It is well known that immersion of the afflicted person in hot water produces a relaxation of the peri-articular ligaments, dilates the capillary system and in some measure allays the nerve tension, thus paving the way for manipulations of the joint without undue stress or strain. There would be seemingly little difference between the tub immersion and pool immersion to a casual observer, but to the arthritic the difference is so great that we experience considerable difficulty in changing them back to tub bathing, if occasion seems to warrant, once they have experienced the pool bath.

In Hot Springs we have adopted the plan developed by the Warm Springs Foundation in rehabilitating the musculature made flaccid through paralysis, to the restoration of functional activity of muscles atrophied, spastic or otherwise not usable from disabling arthritis.

Retraining of muscle groups that have for varying periods been in disuse is much more effective when carried out under the supervision of one learned in the art who personally assists in the performance than when supervised by the average masseur or under our instructions. We have been agreeably surprised to learn that an arthritic sufferer will accomplish vastly more for himself in the way of motion if he is upright under water than he will allow an operator to accomplish for him in a tub. It has also been our observation that physiotherapy, as practiced by an experienced operator during the pool bath, accomplishes better and quicker results during the period of congestion of the capillaries than are obtained when the massage is carried on after the patient has left the bath and reaction has set in. It is sometimes astonishing to note the degree of mobility possible under water in one who is to all intents and purposes muscularly rigid out of water. The buoyancy, the agreeable heat and the knowledge that greater freedom of motion is possible not only stimulates the chronic sufferer physically, but presents a new mental outlook on life. And I want to stress the psychological influence as a necessary adjunct in rehabilitating these sufferers.

SUMMARY

(1) We have been hopelessly divided in opinion as to cause and treatment of chronic arthritis for at least a hundred years.

(2) Decidedly pertinent facts have been learned in relation to the arthritic process and these facts are seemingly interpreted to suit one's individual fancy.

(3) An outline of the writer's interpretation of the dual process resulting in chronic arthritis is given.

(4) An untraumatized joint does not suffer calcium change.

(5) A suggestion is offered that the edematous joint is at all times in danger of a calcium disturbance.

(6) An allergic individual may be subject to recurrent exacerbations of pain and swelling as often as the offending allergen gains access to the circulation.

(7) The spa treatment is specifically aimed at the result of and not the cause of the arthritic change.

(8) The advantage of the hot pool bath over the tub bath is emphasized.

DISCUSSION (*Abstract*)

Dr. Chas. W. Wainwright, Baltimore, Md.—The essayist rightfully deplores our lack of understanding of the nature of the arthritic process, but I am sure all will agree with me that this is in the main due to the complexity of the problem rather than to any lack of effort toward its solution. I cannot, however, agree that the broad groups of proliferative arthritis, on the one hand, and degenerative arthritis on the other, are determined by calcium deprivation in the former and calcium deposition in the latter, the results of a variety of joint injuries. These changes do occur, but are, I believe, the result, directly or indirectly, of the arthritic process and not an integral part of the mechanism. In proliferative arthritis the pathological anatomy is that of acute or chronic inflammation, whereas in hypertrophic arthritis it is a degeneration of the joint cartilage. In 1909 Nichol and Richardson demonstrated this essential difference and more recently Keefer and Bauer and others have shown degeneration of joint cartilage to be present with increasing frequency in succeeding decades of life, with or without symptoms.

The treatment of arthritis then resolves itself into two phases:

(1) The relief of the arthritic process.

(2) The treatment of the results of the arthritis.

If a subsidence of the inflammatory reaction in proliferative arthritis can be brought about before destructive changes occur there is no need for further treatment except for the relief of the associated muscle spasm, contractures, and so on. In hypertrophic arthritis the degenerative joint changes are permanent and what we really do is treat the symptoms which arise often only periodically therefrom. The essayist appreciates and wisely states that it is with the effects of arthritis that the spa treatment and physiotherapy in general deal. The spa then occupies in the case of rheumatoid arthritis an intermediary position between the relief of the inflammatory process on the one hand and the correction or improvement of the permanent effects on the other. The spa's position is an exceedingly important one and

you have just heard the more advanced ideas in physiotherapy. It is obvious that it is useless in the treatment of a permanently damaged joint, and I am sure that most of us have had the experience of undertaking some form of physiotherapy before the inflammatory process has sufficiently subsided to warrant its use, with the result that the inflammatory reaction is intensified rather than helped.

In hypertrophic arthritis the first stage in the treatment is of no great importance, as the joint change is permanent, and our lack of understanding of the mechanism by which the degenerative change is brought about makes any effort to alter the progress of the change of little avail. In this type of arthritis, then, in which inflammation is not the important factor, the spa treatment and physiotherapy find their widest scope.

The intelligent treatment of arthritis demands a careful differentiation of the many types of arthritis, as well as the exclusion of conditions which are readily mistaken for arthritis and there is no field in medicine in which diagnosis is generally so lax. Furthermore, there must be an understanding of just what one is trying to do by treatment. And wise is the man who appreciates his limitations.

Dr. Wootton (closing).—It has not been my intention to center your attention on a possible solution of the vexing problem of how and why an arthritic joint. I do not disagree with the ideas of Dr. Wainwright, though I think the atrophic joint results from serum absorption of calcium from an injured articular surface and a hypertrophic joint may be due to the same process as results when a fracture occurs. In this instance the denudation of cartilage is a necessary predecessor to the change.

However this may prove to be, it is my aim and object first to have you think of any chronic change within the joint as a two-fold process, and secondly that the spa treatment is aimed at the results of the arthritic manifestations rather than the constitutional derangements.

ACUTE RENAL INFECTIONS*

By W. Houston Toulson, M.D.
Baltimore, Maryland

In general there are two chief divisions of acute renal infections: the infections occurring with obstructions to the urinary tract, and those that are brought to the kidney principally by the blood stream. The bacteriology, pathology, symptoms and treatment of these divisions are often entirely different.

The infections due to obstructions lend themselves to more thorough study because of their frequency in childhood, when they are often due to anomalies. They are also frequent in pregnancy and in prostatic obstructions. These are the "ascending" types of infection of the kidney. The infections of blood stream origin usually are more acute and do not permit of so prolonged an observation as the lesions due to obstruction permit, and for this reason they are not so clearly understood. These are the "descending" type.

The blood borne infections, which are the chief interest of this paper, have been divided by Cabot into four groups.

(1) Fulminating type.
(2) Acute type.
(3) Subacute type, picturesquely termed "carbuncle."
(4) Borderline case.

Etiology.—This disease of the kidneys seems to affect persons between the third and fourth decade and men more often than women. Most of the infections are due to pus producing cocci, the *B. coli* as well as other pyogenic organisms appear from time to time. Infections from *B. coli* are more than apt to be mild while coccal infections are usually severe in the kidney. Coccal infections may be recovered from the urine, especially by centrifugalization and, of course, from the kidney at the time of operation. Blood culture, however, will often be negative.

Pathology.—This type of infection usually involves the cortex of the kidney, rapidly extending to the medulla and though it may be situated anywhere on its surface, it usually occurs at the upper or lower pole, where it soon causes a perinephritic abscess. The renal lesion often follows some suppurative peripheral lesion such as a boil, carbuncle, septic wound and occasionally osteomyelitis, and, as Cabot thinks, less often recognized, it occurs following infection in the upper respiratory tract. For example, children are particularly prone to renal infections following nose and throat infection. Kretchmer reports a case occurring seven months after a bone felon.

"An explanation of the massive abscesses of the kidney which are not uncommon may be threefold: They may be the result of considerable areas of necrosis produced by thrombosis of venous channels which lie in relation to much smaller foci; the rather marked tendency of these lesions to assume a pyramidal shape and the rather marked tendency to occur at one pole or the other, or they may be truly embolic.

"A clear conception of the intimate relation between blood stream infections with pus producing cocci, multiple or massive abscess of the kidney, perinephritis and its offspring, perinephritic abscess, seems important. These are, I believe, but various stages or aspects of the same lesion, and if constantly borne in mind will assist considerably in solving some of the difficult problems in this field" (*Cabot*).

In the foregoing the process may be arrested

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at any point and become chronic, or may clear up without serious renal damage. This is indicated by the common finding, both at operation and at autopsy, of adhesive bands running from old scars in the kidney to its fatty capsule.

Symptoms.—Type 1, the fulminating type, called also by Brewer "septic infarction of the kidney," is rare and is characterized by extreme prostration with abdominal pain and distention, nausea and vomiting, often with chills, often bilateral, with predominating lesion on one side, and of course the condition is confused with acute intraperitoneal conditions. There is costovertebral tenderness and staphylococci are found in the urine. Unfortunately many of these cases are undiagnosed and they usually die whether diagnosed or not.

REPORT OF CASE

F. J., a white man, age 46, was admitted April 3, 1936, with a history of two-day illness beginning with chills and fevers. His temperature on admission was 103°, there was extreme abdominal distention, but slight tenderness was present in the right costovertebral area. The urine was clear but staphylococci were found in specimens from the right kidney. The pyelogram was not informative. This is usual in conditions like this. Exploration of the right kidney showed the cortex to be studded with hemorrhagic areas intermingled with punctate abscess, culture from which grew staphylococci. This patient died a few days later from septicemia and on autopsy a beginning similar condition was seen in the opposite kidney. This case is described to show the difficulty of making a diagnosis early enough to institute helpful treatment.

In Type 2, the acute type, pain is referred to the kidney area, there is high fever and marked leukocytosis, an enlarged kidney may be palpated, the urine is loaded with cocci and there is little trouble in making a diagnosis.

Type 3, the subacute type, contains the cases that Cabot says are "picturesquely termed 'carbuncle'," and in which the symptoms are more fully described. Many an onset has been mistaken for influenza or for an intra-abdominal inflammation (appendicitis, cholecystitis, ruptured ulcer or other intraperitoneal process), until the initial lesion has progressed sufficiently to give renal symptoms.

Perirenal extension is what usually gives the referred symptoms. If the extension is anterior to the kidney, between it and the peritoneum, there is likely to be rigidity to the rectus muscle on this side, tenderness below the liver (in the gallbladder region) or of the spleen or splenic flexure. If the infection is of the lower pole with retroperitoneal extension downward, the symptoms may be referred to the region of the cecum and appendix, or there may be so much spasm of the psoas muscle and flexion of the hip as to simulate a Pott's disease (Aschner). If confined to the upper pole of the kidney, limitation of respiration from involvement of the diaphragm may give a picture not unlike that of an acute pleurisy. The onset may be rapidly fatal or may occur like a renal infarction with chills, high fever, sweats and prostration; or there may be gradual intermittent fever and low sepsis, or the onset may be insidious with low remittent fever, chilliness and gradual loss of weight. The leukocyte count is high (15,000 to 30,000). There may be a long latent period before cortical abscesses, carbuncles or perirenal abscess form (Hinman). History of a recent case is as follows:

A. P., a white woman, age 31, was admitted June 9, 1936. She delivered on the way to the hospital. She ran fever from the time of admission ranging from 101-102.6°. On June 11, 1936, it was first noticed that she had a boil on her right elbow. June 13 there were several small furuncles about both arms and legs; as some disappeared others would form. June 15, she developed pain in the right upper quadrant; at this time a slightly enlarged, tender and painful kidney was palpated. The urine contained many cocci all during her admission. After watching the progress of the infection for a few days, an exploration of the right kidney showed a carbuncle occupying almost the entire upper pole with localized perinephritic abscess, necessitating a removal of the entire kidney.

In Type 4, the borderline cases, the symptoms are not clearly defined and there is little to attract attention to the kidney. The suppurative peripheral lesion may antedate the kidney symptoms, if present, by a considerable period. Usually there is a moderate degree of costovertebral tenderness, easily overlooked in a routine examination, but practically all cases show cocci in the urine. Many a case heals and goes unrecognized, but leaves the scars and adhesive bands in the kidney and fatty capsule.

Diagnosis.—In addition to the symptoms of the various types of renal infections, the x-rays, as Cabot points out, are more useful in tracing the course and precise location of the disease than in its original diagnosis. The points Cabot makes are:

(1) The clouding or absence of the psoas shadow in relation to the development of perinephritic abscess.

(2) The tendency to a mild degree of scoliosis of the lumbar spine, with the convexity *away from* the diseased side.

(3) The effects on the movements of the diaphragm, particularly in its inner portion and par-

ticularly in relation to massive abscess or perinephritic abscess about the upper pole.

(4) The limitations of the normal motility of the kidney, as shown by intravenous urograms taken in both the Trendelenburg and vertical positions.

(5) Retrograde pyelograms are of little help as far as the outline of the pelvis and calyces are concerned, but intravenous pyelograms will probably help by indicating something of the deficient function of the diseased kidney.

Treatment.—In the fulminating type nephrectomy at the earliest moment that a reasonably certain diagnosis can be arrived at is the only available method by which recovery can be assisted.

In the acute type again, Cabot says: "The course is unpredictable." Complete recovery without surgical intervention commonly occurs and for this reason it is best to await the development of the infection. If operation is indicated because of renal or perirenal abscess, a thorough exposure of the kidney is necessary with removal of the capsule and drainage "even to actual scooping out of the localized abscesses, is often appropriate." Vaccines and urinary antiseptics do not seem to have any effect on the progress of the disease. Neoarsphenamine is of real value in treating chronic infections of the urinary tract and it may be worth trying in these acute parenchymatous lesions.

RADIATION THERAPY OF CARBUNCLES*

By CHAS. O. KING, M.D.
Birmingham, Alabama

Much has been said and written regarding the therapy of superficial inflammatory lesions, especially carbuncles and furuncles. Surgeons still cling to the theory that total excision is the method of choice. Dermatologists feel that many can be treated more successfully by local measures as radiation, thereby preventing many unsightly cosmetic results as scars and keloids. This leaves the practitioner in a quandary as to a wise choice. With few exceptions, most carbuncles and furuncles disappear regardless of the kind of treatment and some with no treatment whatever. We are attempting to determine the treatment which is most rapid in cure, causes less scarring and makes the patient most comfortable while he is recovering.

The value of radiation therapy in acute inflammatory conditions has been increasingly recognized in the last five years. This is apparently due to reports of much recent experimental work.

Coyle,[1] Hodges,[2] Desjardins,[3] Pordes[4] and several others have shown the influence of irradiation, especially when it is employed during the stage of maximal leukocytic infiltration, before the stage of suppuration. The mode of action of irradiation has now been fully explained by the experiments of Heineke,[5] Whipple, Krouse, Piepenborn, Desjardins, and others. Heineke from his experiments on dogs, rabbits, mice and guinea-pigs, was able to show the sensitiveness of lymphocytes to radiation.

When sufficient radiation was given these animals to cause death, autopsy revealed, although the majority of the organs were normal, in the spleen, mesenteric and other lymph nodes and intestinal lymph follicles, marked lymphocytic destruction. The stroma was more prominent as the lymphocytes diminished in number. Within from two to three hours after irradiation a decided destruction of lymphocytes was found to begin and also a disorganization and fragmentation of the nuclear chromatin of the cells. The phagocytic disposal of the degenerate nuclear chromatin continued until the lymphocytes in the follicles were largely destroyed. In a short time the phagocytic reticular cells began to disappear, leaving the connective tissue frame work, the blood vessels and a number of round cells with a bright nucleus. A few days after irradiation, degenerative changes and alteration in other cells were noted, especially eosinophils and polymorphonuclear leukocytes. Heineke attributed the different changes in the tissue to variation in the focal skin distance and the thickness of the tissues. Worthin[6] found, in fifteen minutes after applying x-rays to animals, unmistakable evidence of disintegration of the lymphocytes, which continued for several days.

Several investigators have shown that radium and x-ray exert the same influence on the small round cells of the thymus gland, and they reach the conclusion that these cells are lymphocytes.

Desjardins' theory is that the x-rays destroy the lymphocytes and thus set free their protecting materials, which enable them to destroy or neutralize the bacterial or other toxic products which give rise to the defensive inflammation.

*Read in Section on Dermatology and Syphilology, Southern Medical Association, Thirtieth Annual Meeting, Baltimore, Maryland, November 17-20, 1936.

There can be little question that the rays act by destroying the infiltrating leukocytes and that the value of radiotherapy depends chiefly on this action.

The clinical response to radiation of carbuncles and boils is usually very satisfactory. Within twelve to twenty-four hours the pain will be markedly relieved and in some instances disappear entirely, fever diminishes and the local appearance changes somewhat.

If treated early, the infection may be aborted entirely and in a few days the redness disappears. If the infection has progressed sufficiently before treatment (within twenty-four to thirty-six hours suppuration has taken place) evacuation should be done and in five to seven days the lesion should be healed. This can usually be accomplished by a trochar or small needle, for by this time the pus has become thin and watery. The results of early radiation of carbuncles about the face, especially the nose and upper lip which, on account of the rich lymphatic supply, are always dangerous to tamper with, and are gratifying. It assists in localization and promotes early suppuration, relieves the pain and usually an excellent cosmetic result follows. The duration of treatment is generally lessened to one-half of the time required by the purely surgical measures. Deep carbuncles of the neck posteriorly always practically demand surgical interference. I have seen two such cases recently where the lesions were well down to the fascia. The depth of these would have required a large amount of roentgenization on account of the thickness of the structure. Wide incisions and curettage of the entire lesions, bringing all the openings to one, hastens suppuration and sloughing. As is well known, the chief danger in furuncles of the face is cavernous sinus thrombosis and infection by way of the facial vein. Traumatism is believed to increase the risk of thrombophlebitis with meningeal sequelae. Even the use of a sharp knife, under the strictest asepsis, may aggravate and spread the infection.

Gerber[7] believes that a general immunizing mechanism is set in action by the rays. Schroder noted that in widespread erysipelas infections irradiation of one area often resulted in regression of an area that had not been in the field of treatment. Similar experiences were reported by Schrens in the treatment of furuncles.

Heidenhoim and Fried have made very careful serological studies in a large number of cases and found a definite and constant increase in the bactericidal substances present in the blood after irradiation as compared with the condition before. In fifty-five of their cases pus which developed after irradiation was found to be sterile.

Potter believes that the x-ray is useful in the treatment of furuncles and carbuncles in a threefold way: (1) in the form of a localized erythema dose, to abort incipient boils; (2) in the form of a local treatment to hasten the healing and to make well developed furuncles less painful; and (3) in the form of a wide light exposure to act as a preventive and prophylactic.

Hodges states that the roentgen ray acts almost like a specific in the majority of carbuncles. He adds, however, that the early deep types are probably treated most effectively by complete surgical excision.

During the last five and one-half years I have had the opportunity to treat thirty-nine carbuncles with roentgen ray. These were all private patients, with whom a close watch could be kept of all except six. These latter will be omitted from the report because accurate data cannot be obtained and the records are too meager to be of assistance. Improvement of a lesion after irradiation means any shortening of the cycle of the carbuncle from its natural course.

We considered that we had aborted the lesion when it disappeared in two days or less and that we had failed if the extent and duration of the process were not appreciably shortened, even though analgesia had been attained.

The location of the carbuncles were: twelve on neck, eight on face, four axilla, five extremity and four on the back. Of this number, three were complete failures. Two of these were seen early, but both were on the back of the neck and of the deep type, in which the mass appeared to be fixed almost as in a malignancy. Surgery had to be resorted to in each, and both were found to be down in the fascia under the subcutaneous tissue. Sloughing occurred later and a deep crater was left. The third failure was in a case previously treated by incision, where evidently the infection had been carried down to the deeper structures by surgical procedures. Yet, much relief of pain was obtained in this case. Many patients consult the physician only after considerable pain and discomfort and some lesions had progressed several days before treatment, yet definite improvement was obtained in 33 1/3 per cent of the cases.

The dosage used in twenty-seven cases was according to McKee's technic: $\frac{5 \times 7 \times 6.15}{10}$ 3 mm. aluminum filter 350 R. In six cases one-half unit unfiltered x-ray $\frac{6 \times 6 \times 46}{10}$ 175 R was used.

We found the filtered radiation much preferable. It gave quicker relief of pain and local symptoms and much earlier suppuration of the lesion.

In no case was x-ray repeated at an earlier interval than five days where filtered irradiation was used. It was repeated on two occasions where unfiltered radiation was used in three days.

It was found that the value of radiation decreases somewhat in larger lesions in its ability to reduce pain and time of suppuration.

The method of treatment was in every instance to screen with lead to within 1.5 cm., with lead out beyond the indurated area.

Of the eight cases treated on the face and lip, five were treated with filtered radiation and three with unfiltered. The local symptoms of swelling, pain and suppuration were more quickly relieved with filtered than with non-filtered radiation. Improvement in two unfiltered cases was nil.

In the axilla three cases were treated with filtered and one with unfiltered radiation. A quick response was noted in all four, yet in this area the response to unfiltered rays was as extraordinary as to filtered.

Practically the same results were obtained with filtered and non-filtered radiation in all of the extremities. One case was very slow in suppurating; however, all patients noted early relief from pain, and very little difference was observed in the time of suppuration and symptoms.

There were two complete failures in carbuncles of the neck, but, as previously stated, both of these were very deep and there is some doubt as to whether the dose was filtered sufficiently and whether as large a dose as required was given on account of the depth of the lesion. Two other neck cases, one the non-filtered case, were slow in response and it was problematical just what was accomplished by radiation. A man 79 years of age who had not been able to sleep or rest for forty-eight hours, after treatment with filtered radiation had in eighteen hours almost complete and spectacular relief of all symptoms except swelling and induration.

Of the patients with carbuncles on the back, two had immediate relief of symptoms, one comparatively quick relief and one very little. In both, filtered radiation was used.

CONCLUSION

(1) A report has been made of the treatment of thirty-three cases of carbuncles by x-radiation.

(2) Radiation therapy was successful in 66 per cent of these cases.

(3) Filtered radiation is superior to unfiltered in the treatment of carbuncles.

(4) The earlier a case is treated the better the results as to relief of pain, reduction of the lesion, and cosmetically.

REFERENCES

1. Coyle, R. R.: X-Ray Carbuncles. M. Elect. & Radiology, **7**:139-142, 1906.
2. Hodges, F. M.: J.A.M.A., **85**:1292, 1925.
3. Desjardins, Arthur: Radiotherapy for Inflammatory Conditions. J.A.M.A., Feb. 7, 1931.
4. Pordes, Fritz: Uber die der Wirkung der Roentgenstrablen, **36**:656-657, 1923.
5. Heineke, H.: Uber die Ein Wirkung der Roentgenstrablen auf Tiere, **1**:2090-2092, 1903.
6. Worthin, A. S.: Experimental Study of the Effect of Roentgen Rays upon the Blood Forming Organs. International Clinic, **4**:243-277, 1906.
7. Gerber, Isaac: X-Ray Treatment of Superficial Pyogenic Infections. Rhode Island Med. Jour., 1926.
8. Light, R. V.; and Sosman, M. C.: N. E. Jour. Med.
9. Liddy, E. T.; and Morton, A. S.: Minn. Med. Jour., Aug., 1930.

DISCUSSION (*Abstract*)

Dr. William Howard Hailey, Atlanta, Ga.—Dr. King has been conservative in his presentation. His results have been the same as those obtained by most physicians who have treated carbuncles and furuncles by radiation.

The great relief which frequently comes in a few hours following radiation is almost unbelievable. One may say that it is psychological. Of course, this can be said of any therapeutic measure.

I have not kept an accurate record of the number of my patients, but I am convinced that radiation therapy for carbuncles and furuncles is a conservative measure preferable to radical treatment.

Dr. Carey C. Barrett, Lexington, Ky.—There is nothing new about this treatment. We find as far back as 1907 that Coyle reported a series of cases in which favorable results were obtained. Sprinkled through the literature since that date are a few articles, all reporting favorably on this therapy. All of us are familiar with this treatment and use it. In spite of these facts, carbuncles are usually treated by some other means. I think the essayist's report illustrates this point. He has collected only thirty-nine cases of this common disease in five and one-half years of active practice. For some reason the profession generally is skeptical of or unfamiliar with this method of treatment.

As has been pointed out in several comprehensive articles in the recent literature, other acute and chronic infections respond to roentgen ray therapy. A few of these of major importance are: erysipelas, gas gangrene and postoperative parotitis. Here, then, is a broad field

for study to clarify the technic, the indications, and limitations of this form of treatment.

Dr. King (closing).—This paper was not presented to prove that x-ray is a panacea in the treatment of carbuncles and furuncles, but that it is a valuable adjunct in the treatment of these lesions. If they are treated early, our series shows that the patient is made much more comfortable, some cases are aborted and suppuration and recovery are hastened.

THE PHYSICIAN IN COURT*

By ROBERT CAROTHERS, M.D.
Cincinnati, Ohio

In the life of the average physician, a court appearance is a comparatively rare occurrence; and, in most instances, when it is an initial experience, it can prove disagreeably enlightening. In his daily routine, a physician is accustomed to authority; he is the one to ask questions and expect respectful answers; his the right to give orders and demand obedience and compliance. But in the court room a very different picture presents itself, and unless he is possessed of the mental and emotional agility suddenly to throw himself into reverse, he will probably emerge from his first court experience with a badly deflated ego or a feeling of general animosity.

The physician in court has several roles that he can be called upon to fill. There are times when he may feel compelled to become the plaintiff in a suit against a former patient or the executor of an estate in order to recover for services rendered, which, apparently, can in no other way be satisfactorily collected. Suits of this nature are to be avoided, if possible, since they not only endanger a physician's popularity in his community, but it is to be forcefully remembered, the average jury is woefully incapable of setting a correct value on a physician's services; so, that all too frequently, even though he wins the suit, by the time all the expenses thus encountered are met, he actually has lost. Years of experience have proven that much the better course to pursue is to effect some sort of compromise, even though at times it may seem wholly inequitable.

As a defendant, the physician may unwillingly be dragged into court in a malpractice suit. It might be well at this juncture to define exactly what constitutes malpractice. According to Webster:

"Malpractice is the treatment of a case by a surgeon or physician contrary to accepted rules and with serious results to the patient; hence, any medical or surgical fiduciary duties. A question of medical or surgical malpractice or negligence is determined by what might be reasonably required under the circumstances of the law."

This definition, however, needs some amplification. When a physician accepts a patient for medical or surgical treatment, he must not only be primarily qualified, but also equal to the average physician in his community treating such cases; if not, he may be guilty of malpractice. Negligence (used synonymously with malpractice) in turn, cannot be proven when every possible care and attention have been given before and after the course of disease or operation. In order to make a case of malpractice, however, there must be shown a mental or bodily injury caused by the physician's negligence. In a malpractice suit the full burden of proof falls upon the claimant, who, also, must waive all rights to confidential communications between himself and the physician, defendant, including x-ray films, hospital and all other records in the case.

Malpractice suits may come from curious sources. On rare occasions the unfortunate, unintentional remark of a loyal fellow physician or surgeon has sown the seed of such a suit. Words are given dangerous meanings at times and should be most carefully used. Truthfully, and without hesitation, it can be said that 99 per cent of all malpractice suits arise in the brains of jealous, vicious, unscrupulous physicians who have been aided and abetted by avaricious, unprincipled lawyers. The writer can not recall at any time meeting a lawyer of high standing on the plaintiff side of a malpractice suit. It is equally rare to find a poor physician unprotected by insurance the defendant in such a suit.

Should malpractice suits become too numerous in any community, they may have a nefarious reaction, not alone upon the defendant physician, but may have an unfortunate influence upon the entire medical profession, and the public as well. Bitter enmities have arisen between fellow practitioners resorting to unwise and frequent testimony against each other in a spirit of retaliation. In one city it became so prevalent that surgeons refused to treat people suffering from fractures, which compelled them to travel elsewhere for surgical attention, or assure the surgeon assuming the responsibility protection from a suit. It eventuated, finally, in the state hospital's taking over the fracture cases. A much happier situation existed in ano-

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ther thriving industrial city where no physician would give damaging testimony in a malpractice suit, except when subpoenaed, and then none too satisfactorily for the plaintiff. The innocent physician threatened with a malpractice suit and firmly convinced in his own mind that no possible claim of negligence can exist, should, for the benefit of his own reputation and the honor of his profession, fight the suit to the bitter end. A situation might, however, arise making a malpractice suit apparently justifiable. When facing such a circumstance, it is the wise man who can and does effect a settlement out of court.

An exceedingly important role played by the physician in court is as a general witness to testify to the facts in a suit being heard, or as an expert to give his opinion or expert testimony on situations involved in a case brought into the trial of the suit.

When a physician is subpoenaed as a general witness, it is required of him, as of all citizens, to testify fully and completely to the best of his ability for the ascertainment of truth and justice. He is expected to answer the questions propounded as briefly and correctly as possible, based on his knowledge of the facts in the case. For this service he receives $1.00 *per diem*. If, however, one of the counsel trying the case asks the physician his opinion of some point of fact occurring in the testimony, his status as a witness immediately becomes changed from that of a general to an expert witness. It may be well here to insert a warning to physicians with little court experience to acquaint themselves thoroughly with what constitute simple medical facts and an expert professional opinion; because it is considered clever on the part of tricky lawyers to chisel an opinion from a clever physician of good standing and influence in the community without proper compensation. It is the prevailing rule in most states not only to compel a physician to appear on subpoena, but also to give answers to all questions asked while on the witness stand; if he refuses, he may be subject to a fine or imprisonment for contempt. In those states it is considered that a physician who is forced to spend his time in court suffers no greater loss than the average professional or business man and that the statutory fee is sufficient. The State of New York is outstanding in being at variance with this general custom in that it holds that physicians may not be called upon to give opinion or expert testimony as to conclusions which are not based on personal knowledge without a prior agreement for compensation over and above the statutory fee for a witness. New York courts hold that a physician's knowledge is a part of his capital which no litigant has the right to use without proper compensation. The writer does not know which other states, if any, hold the same view.

One of the most interesting, important and difficult roles the physician is called upon to assume in court is that of an expert witness to give opinion evidence in a case under trial. He may be employed by one of the litigants to familiarize himself thoroughly with all the medical or surgical aspects of the case and by testimony present them to the jury. He is usually given plenty of time to evaluate all the intricate points involved by an examination of the person or persons in whom his employing counsel is interested; also x-ray films, laboratory and all hospital reports, and an autopsy report, should such have been made. After a searching review of all the facts, conferences with his employing counsel would be advantageous, so that they may have a perfect mental understanding of a correct method to pursue, questions to be asked and answers given. Such a course of conduct in the hands of a good trial lawyer with a well prepared, experienced expert witness or witnesses would present a case to a jury thoroughly familiar with all its details and ramifications.

Without previous preparation the physician may be put at a disadvantage and be unable to give an answer satisfactory to both himself and the jury. It is to be most emphatically remembered the expert witness, in fact, any witness, owes his responsibility to the jury. Although the physician is employed by one side in a case, he is not there to plead its cause and is not a partisan to the suit. Testimony given in a nonpartisan manner will carry much weight and be thankfully received by any jury of twelve men and women who are to render the verdict after instructions from the judge. A jury represents a cross section of the community's personnel with every type and character of person. Juries are as dissimilar as personalities and there is no foretelling just what verdict that body of twelve men and women will render. It has always piqued my curiosity why twelve and not any other number of persons were selected for the serious deliberation of determining justice. Recently in a little mixed group or representative thinkers, the writer asked that question. A lawyer said it was from the old English law; another lawyer believed it had always been so; a writer thought, perhaps, to be an emulation of the twelve apostles; a minister, however, suggested that the number may have some connec-

tion with the twelve signs of the zodiac. The last answer gave food for thought and sent the writer to consult an astrologer, whose explanation follows. Take it for what you think it is worth:

"While it is an accepted astrological fact that approximately 25,000 years must elapse before the exact counterpart of any person living can be reproduced and that consequently no two people can be exactly alike, nevertheless all individuals born under any one zodiacal influence do experience similar fundamental reactions to related groups of circumstances. Therefore, during the reign of Charlemagne when astrology was held in respect and a certain amount of reverence, the jury system had its inception with the establishment of a group of twelve men, one from each sign of the zodiac, with the idea of still furthering absolute justice. This, because it was believed that of such a group at least one born under the same zodiacal influence as the accused would be able to comprehend so intimately the accused's viewpoint and reactions that he could elucidate it clearly to the other eleven members, and make something of a final plea for understanding and consequent justice."

And it has been the writer's personal experience that still today on every jury there exists a similar key man. To be able to single out that man and direct one's testimony to him is the secret of making that testimony valuable.

The physician preparing to enter the court room as a witness has a responsibility to himself as well as the jury. With this idea in mind he should wish to appear well so that when he leaves the witness stand he should feel assured that he has, at least, made a good witness and left a favorable impression with the court and jury.

Clothes do not make the man, but they certainly can be his undoing. Shakespeare says: "The apparel oft proclaims the man." The prevailing fashion of the period and locality is to be preferred. A slovenly, badly groomed witness of any calling starts in with a handicap; but the physician, whose very profession demands cleanliness and neatness, should be particularly careful.

Manners on the witness stand are equally important. An inexperienced witness may feel as nervous and embarrassed as an adolescent school boy reciting the Declaration of Independence, but he should nevertheless bear in mind as a witness the appearance of uneasiness such as adjusting his neck tie, fidgeting in the chair or constant motion of his hands detract not alone from his personality, but frequently from the weight of his evidence on the jury.

Nothing is more valuable to a witness than a clear, well modulated voice which can be easily heard, enunciating each word distinctly. The average witness is very deficient in making himself heard, which makes the evidence of the ones who are heard more forcible. After the witness has sworn to tell the truth and takes the witness stand, he is asked his name. If he answers with a comparatively loud voice, he calls the jury's attention to himself, making it slightly easier to hold them later. It is equally important that his qualifications as an expert be fully given, even though they be waived by the opposing side.

The expert witness is given much latitude in his answers and is privileged, as he should be, to give complete explanations to the questions asked, which should, however, be in language so simple that a child may understand. Most medical words can be translated into every-day language. If these rules be observed, a good trial lawyer and a trained witness or witnesses can present a case so strongly that it will be difficult to overthrow.

After the direct testimony is finished, the witness is given to the opposing side for cross examination. There are times when he is not questioned at all, or he may be asked just a few questions. Again, the opposing counsel may put the witness through a very severe grilling to break down his direct testimony. An automobile never skids twice in the same manner and an expert witness never meets the same tactics in different cross examinations; and he is more or less thrown on his wits to meet difficult situations. After all ordinary efforts have failed to break the testimony of a witness, the cross examiner may attempt to confuse, irritate or bully him. The smart way to combat such methods is to remain cool, calm and collected. Passion is counteracted by dispassionateness, and bullying is counteracted by an attitude of extreme dignity which is immune to such puerile tactics. It never pays to get funny on the witness stand. Cynicism, sarcasm and wise cracks have no place, but a little subtle humor or a very appropriate bit of wit are permissible and sometimes serve a purpose.

On an occasion in a Chicago court room a distinguished internist of international reputation had finished giving a brilliant testimony on direct examination. The opposition took him for cross examination.

Question: Dr. **X**, you have enjoyed a very outstanding and enviable career as a Chicago physician. Is that not true?

Answer: I prefer others to answer that question.

Question: You have had as patients some of the wealthiest and most prominent people in Chicago. Is that true, doctor?

The doctor shows both anxiety of a possible trap and a little flattery as well.

Answer: Wealth is as one takes it, and cannot be weighed altogether in money.

Question: Doctor, you were Mr. Armour's physician. Is that true?

Answer: It is.

Question: Where is Mr. Armour now, doctor?

Answer: He is dead.

Question: You were Mr. Potter Palmer's doctor, were you not?

Answer: I was.

Question: And where is Mr. Potter Palmer at present, doctor?

Answer: He is dead.

Question: And Mr. Marshall Field. Where is he, doctor?

Answer: He also is dead.

Question: And you were his doctor?

Answer: I was.

The witness may be excused.

On another occasion, on direct examination, an experienced expert witness had finished his testimony. He emphasized his fairness by giving the opposition a little advantage on one point involving a condition of the right knee joint. Upon cross examination the opposing counsel decided to emphasize that point, thinking it would be to his advantage. The witness was asked a few unimportant questions accompanied with complimentary remarks. When he thought the witness might be misled by flattery, the cross examiner, like a flash, asked him if the condition of the claimant's knee was caused by the accident. "Give your answer Yes or No," the attorney commanded in a very loud voice. For a moment the witness hesitated in order to focus the attention of the jury on his answer. In a clear, distinct voice easily vibrating throughout the entire court room, the witness replied:

"It is the privilege of opinion or expert witnesses to answer questions as they see fit in a manner best to enlighten the jury; but, since you are somewhat insistent on the character of my answer, I can say *no*. His right knee has not been caused by the accident he experienced: it existed before the accident. The left knee shows the same condition, though not quite so pronounced."

The witness was excused. Two types of witnesses are thus illustrated. The former much the greater doctor, but the latter a better witness.

There are tricks in all trades and the law is not exceptional in its hypothetical question. As the writer understands it, a hypothetical question is an assumed aggregation of facts. Although there may be no evidence at all as to the facts inserted into the hypothetical question, it is assumed the jury will find such facts to be established in the testimony. Real facts as deduced from the testimony may be eliminated and assumed facts inserted. The writer disdains any effort to elucidate the legality of such proceedings. A hypothetical question is a trick and is said to make law interesting. It is, the hypothetical question, a bugbear to an expert witness, asked, perhaps, to emphasize his embarrassment, and he should be most careful or he may upset all the testimony which he may have previously given or if he be a witness on his own behalf in a malpractice suit, he may convict himself. It is a vicious type of question at all times, and should be so treated. Just how to handle it depends on one's ready wit. The writer once absolutely refused to answer a hypothetical question, stormed the jury, was removed by the bailiff from the witness stand and fortunately was not sent to jail. Another method is to ask for a copy of the question that the witness may read it carefully and answer it piecemeal, which is not answering it at all. And then the witness can always say, "I have not seen the case and cannot intelligently answer the question." Should insistence continue, the witness can always have recourse to "I don't know." It is difficult to make one know what he does not know.

The physician in court may occupy a position comparable with the average individual on either side of a cause in litigation. His expert testimony may make him a most important person under other circumstances. He may be the one who convicts the criminal or saves the innocent victim from persecution. He may effect the solution of a contested will. He may secure justice for an injured plaintiff or protect the funds of a defendant from a malingerer. There are innumerable positions under which a physician in court can be of real service.

By experience only he learns the game. If he be a neophyte he has only to remember to keep his head and tell the truth, and, above all, it is not to be forgotten that the judge is his guide and the jury is his responsibility.

DISCUSSION (*Abstract*)

Dr. J. R. Garner, Atlanta, Ga.—The subject of Dr. Carothers' paper is one of vast importance to members

of the medical profession, yet few of us possess sufficient knowledge to recognize the rights and privileges of a physician who finds himself brought into court. In the short time permitted for discussion, I can only hope to emphasize the points made by Dr. Carothers and possibly add one or two features which I feel should have been touched upon.

A physician, like any other man, may find himself in court with reference to matters which have no medical bearing. In such a status he is like any layman, and it was neither the intent or purpose of this paper to discuss such situations; we are interested only in "The Physician in Court" insofar as this attitude has bearing upon his professional career. In a professional capacity, the physician may be:

(1) The plaintiff in an action to recover compensation for services rendered.

(2) Defendant in a malpractice suit.

(3) An ordinary or general witness.

(4) An expert witness.

Physicians have the same right to recover compensation for their services as a merchant has to recover the price for goods sold. Too often we neglect to exercise our constitutional rights along this line and suffer much financial loss as a consequence. There is one point I wish to make which should always be borne in mind when a physician brings suit in an effort to collect his bill, that is that only another physician is legally capable of testifying as to the value of medical services, and this applies with reference to both the establishment of the value of services rendered by the plaintiff or the minimizing of the said value by the defendant.

When a malpractice suit confronts a physician, it may fall under the heading of either civil or criminal law. The essayist has touched only upon civil malpractice which arises from the improper or negligent treatment or handling of a case, resulting in some injury being sustained by the patient. In this connection, I wish to emphasize the qualifications placed upon a physician by the laws of the state. He is required to exercise ordinary care, diligence, and skill, as exists among other physicians in his locality, unless he claims to be a specialist, in which event he is naturally expected to have a higher degree of learning, training and skill than would be expected of an ordinary physician.

I take issue with the essayist when he says that he does not recall meeting a lawyer of high standing on the plaintiff's side of a malpractice suit. True, these cases generally fall into the hands of less reputable and more unscrupulous lawyers, but I have known a few lawyers of high type who have been forced to represent plaintiffs in such cases due to certain relationships and business contacts which precluded their refusal to take the case.

One especially important factor for us to remember is that physicians occasionally err in making a diagnosis. An error in diagnosis is not a legally justifiable basis for a malpractice suit unless there has also been an error in treatment which has resulted in damage to the patient.

Criminal malpractice grows out of the performance of an act or acts which either:

(1) Show a reckless disregard for human life, as for example, gross negligence resulting in death of the patient.

(2) Are expressly forbidden by statutes. Under this heading the most frequent cause for action is the performance of abortions.

(3) Are denounced by common law. An instance would be that of a physician who attempts to render services while he was intoxicated.

Physicians may be either ordinary or general witnesses, or expert witnesses. In the capacity of an ordinary witness he is expected to testify only to facts of which he has knowledge and which he has gained through the use of his five senses and not as the result of special study and training. In some states a physician may be summoned into court as an ordinary witness by service of an ordinary subpoena; in others, Georgia for example, the law applies to physicians as it does to women, preachers, and so on. It is provided that their depositions may be taken in lieu of their being required actually to attend the trial of a case.

Expert witnesses are usually arranged for in advance, and may not only testify to what they know in the capacity of an ordinary witness, but are also expected to express opinions and answer hypothetical questions. Many states recognize the right of an expert witness to special compensation and will not require him to qualify as an expert or to give expert testimony when he has been called into the case under subpoena as an ordinary witness. In states where this recognition is not granted, the physician should remember that he always has the right, when pressed for an answer, to state that "he has no opinion."

The expert witness should be thoroughly prepared to meet a barrage from the opposing attorney on cross-examination. Very broad latitude is granted the cross-examining attorney, and he may question the expert witness upon any matter pertaining to his profession, although it may have no regard to, or bearing upon, the case in question. For this reason, a physician who is not well versed in anatomy, physiology, general medicine, diagnosis, and surgery makes a serious error in permitting himself to be placed upon the witness stand as an expert. He is liable to meet with chagrin.

The manner of an expert witness as he testifies is of considerable moment, and the jury is permitted to consider the manner in which a witness conducts himself while testifying, as well as to consider the subject of his testimony. An embarrassed or uncertain witness is therefore harmful to the issue he is representing, while a too willing or too interested witness loses the force of his testimony.

Attorneys almost invariably demand that a witness answer their questions by the words "yes" or "no." There are many times when this cannot be done and the court will always give the witness the right to qualify or explain his answer before requiring him to reply to a subsequent question.

The hypothetical question, under the law, must be based upon evidence that has been introduced in the trial of the case prior to framing of the question. At times this is quite lengthy and almost invariably con-

sists of a series of many questions so blended that it is impossible to answer the question with any single reply. Under these circumstances the expert witness may reply to the several questions involved independently. He should exercise great care in answering a hypothetical question, as in doing so he may by a single word destroy the value of all of his previous evidence.

In closing this discussion I wish to stress two very important facts for the medical witness to bear in mind:

First, that when he does not know he should never hesitate to say so; it is always better to admit ignorance than to expose oneself to ridicule.

Second, the poorest physician has always forgotten more anatomy, physiology, medicine, and other allied branches than the best lawyer could possibly learn in the short period allotted him to the preparation for trial of his case.

Dr. Robert L. Payne, Norfolk, Va.—Since Dr. Carothers has dealt with the broad principles of the physician in court, I shall direct my few remarks to the subject of the doctor as a witness on the stand.

There are a few things that a physician should remember when going into court as a witness. First, he should familiarize himself with all the features of the problem and get together all of his records of the particular case and take them with him to court. This is important, not only from the standpoint of refreshing his memory, but also because it may be necessary that his records be sworn in as court testimony. Secondly, he should be particular in the medical terms he uses in explaining his case to the jury. The court room is no place for technicalities. Physicians are so thoroughly conversant with medical terms that they do not realize that the jury cannot understand their connotations. Make the language to the jury so simple that any 15-year-old boy or girl can understand, and you will then find that your testimony is more valuable to the jury.

Thirdly, it is highly important that the physician as a witness stick rigidly to facts, and under no circumstances show any partisan tendency in his answers to the questions asked. Fourthly, the physician should pay as little attention as possible to the questioning lawyers, but on the other hand, if possible, should keep his back turned to the lawyer who is examining him and always face the jury and make his replies directly to it.

I was once present at an action in court in which everything depended upon medical testimony. The lawyers for the plaintiff had skillfully succeeded by rough and tumble tactics in thoroughly confusing two important medical witnesses, and finally made one poor old physician break into tears and contradict every statement he had previously made. Finally, a physician very experienced in court was put on the stand and these lawyers immediately began to harangue him in the same manner as they had done with the previous witness. This man retained his poise, answering the questions in a low, calm voice, until finally the lawyer himself became so excited that he began to jump up and down, and walking over in front of the witness, he shook his finger in the witness' face and said: "Look me right straight in the eyes and answer this question yes or no!" The physician rose in his chair, shook his finger in the lawyer's face, and in no uncertain terms said: "You asked the question, and I will answer it to the jury." He then calmly turned away from the lawyer. At this point the judge intervened and said: "That is right, Dr. A.; you are entirely within your premises." It is needless to add that the lawyer stopped his rampage short, and the witness finished his testimony with credit to his side and to himself.

With regard to expert testimony, I feel strongly that we physicians should not accept this sort of an assignment if it is possible to do so. First, there is no glory in being an expert witness, and usually all an expert gets is defamation and a few paltry dollars. An expert knows that his testimony is going to be broken down if possible by the opposing lawyer and accordingly prepares himself for every contingency, which virtually means that his testimony in the final analysis becomes so defensive that without intention he finds himself a partisan and champion of the cause for which he is testifying, and this situation always results in ignominy and shame to the physician, when in reality he has tried to be honest. I strongly believe that no expert witness should go into court except when the court itself requests and seeks his opinion. This problem has come up in the State of Virginia on repeated occasions, and many times efforts have been made by physicians of Virginia and other states to overcome the abuse of the physician in court as an expert witness. I should like to read into this discussion a resolution which came up before my local medical society in 1914. It is as follows:

"Whereas, the matter of expert testimony in the courts of justice is intended to aid the court in determining the merits of the case; and,

"Whereas, expert testimony as now rendered is so degraded into partisan testimony as to be a farce and ofttimes a disgrace instead of a help in meeting the ends of justice; and,

"Whereas, the medical profession is so placed under the laws of Virginia that its members may not refuse service when called upon to render testimony as experts, and so are disgraced by being brought in competition with men who can be bought for a price,

"Therefore, be it resolved:

"First: That the Bar Association of the City of Norfolk be asked to join with the Norfolk County Medical Society in a petition to the next legislature to amend the law governing expert testimony.

"Second: That in the opinion of this society the amended law should direct that the expert be summoned by the presiding judge to give an opinion as to an issue before the court, which issue has been agreed upon by opposing counsel or set up by the court, and that the fee for such expert opinion be taxed in the cost of the case."

This resolution was unanimously adopted by the Norfolk County Medical Association and then passed on to the Bar Association. Nothing further was ever heard of the resolution. I shall leave you to draw your own conclusions.

Dr. Carothers (closing).—When I suggested, in St.

Louis last year, that I would prepare a paper to be presented at this meeting on "The Physician in Court" I did not then know that it would be no easy job. When I got under way I found myself in our law library at the court house surrounded by voluminous pamphlets and books on the subject; my job, then, which was not a plaything, was to cull the best points and condense them into a short paper.

The best advice I can give is to keep out of court if possible, "but being in—should you—beat it that the opposer may be ware of thee." It is for that reason I have attempted to lay down a few rules to follow that your first appearance may not be difficult. If you recall the first major operation you performed, when you were entirely on your own, you did not feel very happy, but you lived through it. So it is in court.

Dr. Payne has emphasized two important points. First, never let a lawyer tell you how to answer a question. Second, have the case thoroughly in hand before going on the stand and present it to the jury in the simplest language possible.

Dr. Garner has presented a phrase, "I have no opinion," which is much better than "I do not know." Most applicable for an ordinary witness. You may know. If so, you are not truthful. It pays to tell the truth.

I can imagine a high-class lawyer with a good reputation representing the plaintiff in a malpractice suit. I do not think I have had that experience. I also can picture circumstances under which a physician should be convicted in a malpractice suit. They are not infallible or angels.

I like the way Dr. Garner handles the hypothetical question. Take an hour or more to answer if necessary, but answer it correctly.

If a lawyer harangues a witness, remember you know more than he does, and if you hold yourself in hand, you can wear him out. Do not answer back or get smart; let him do that.

I attended court in London last summer and was pleased to see the dignity with which it is conducted. The English take their courts seriously. A case of malpractice against a dentist was being tried. I happened in while the dentist was on the stand and being cross examined. He was treated very mildly though he lost his case. I was told afterwards by a surgeon that it was a just decision.

The police court where the riff-raff were being tried was conducted also in a dignified way.

We hear that our laws are patterned after the old English law. Be it so, they are certainly not practiced in a similar manner.

It is impossible to lay down any hard and fast rules in giving testimony. No two cases, no two juries and no two lawyers are alike. The best rule to adopt is to be prepared to meet any situation which may arise. It is somewhat like an abdominal operation. You are not always cognizant of what you will encounter, but you meet the case.

THE EFFECT OF EDUCATION UPON RADIOLOGY*

By HENRY J. WALTON, M.D.
Baltimore, Maryland

Organized medicine always has been vitally concerned with problems of education, not only because it effects the medical profession as a whole, but also the individual physician. The achievements of modern medicine, the high standing of our medical schools, and the great growth of our hospitals are direct results of this higher education of the physician.

As knowledge of medicine increased the specialties developed, and many physicians began to confine their practice to that particular phase or branch of medicine in which they were most interested. All the present specialties, with the exception of radiology, developed along these natural lines, and those who set themselves apart as specialists were accepted, without question, as authorities in their particular fields, and have maintained their high standing as a class to this day.

What happened in the case of radiology? It was during this formative period of the specialties that Roentgen announced to the world his discovery of the x-rays. The medical profession was quick to see the diagnostic possibilities of this new force, and almost immediately many scientifically inclined physicians, some working with physicists, either constructed or bought x-ray machines, and within a few months had successfully produced shadowgrams of the living skeleton, foreign bodies, calculi, lungs, heart, stomach containing bismuth, and even of the fetus in utero. From the very beginning there was keen competition as to what could be shown next by means of this new diagnostic agent, and the enthusiasm of those working with the x-rays is only too well known.

The high ideals of these pioneers, their struggles to have radiology recognized as a medical specialty, the personal sacrifices and physical suffering which many of them later had to endure, so impressively portrayed by Dr. Percy Brown in his recent book entitled "American Martyrs to Science Through the Roentgen Rays," will some day form one of the most interesting

*Chairman's Address, Section on Radiology, Southern Medical Association, Thirtieth Annual Meeting, Baltimore, Maryland, November 17-20, 1936.

chapters in the history of the progress of medicine.

The meager income from patients made the financing of x-ray work, from the very first, a serious problem for the physician. In some instances, hospitals were prevailed upon to purchase the apparatus, and pay for supplies in return for the roentgenologist's professional services to free patients. Many of these hospitals were owned by religious or fraternal organizations with lay members on the board, and the control of managing the x-ray departments gradually fell into the hands of hospital managers and superintendents. The financial side of the practice of radiology was thus emphasized to the disadvantage of the professional side. Little consideration was given to the professional qualifications of those who were to direct the x-ray work. Institutions began to compete with each other by establishing so-called x-ray departments, and this created an unusual demand all over the country for roentgenologists. As there were but few trained men available, physicians with practically no knowledge of roentgenology, sometimes of the failure type, accepted these positions in return for the prestige and experience they hoped to derive from their hospital connections. These so-called roentgenologists were received on an equal footing with the better trained men, and there was no criterion whereby the medical profession or laity could distinguish the qualified from the unqualified specialist. To make matters worse, the hospitals often employed technicians who conducted the x-ray examinations during the absence of the roentgenologist. The roentgenologist was afforded little opportunity to interview patients, and his practice became more or less dissociated from clinical medicine. His skill was too often measured by his ability to describe shadows, rather than by any professional attainments he might possess. Reports made under such circumstances were frequently given but scant consideration, and were read with skepticism by the referring physician, who was often in a better position to interpret the x-ray films than the roentgenologist who had no knowledge of the patient's symptoms.

It was only natural under such conditions for physicians who found the use of the roentgen ray valuable in their diagnostic work to install their own x-ray machines. In some localities this procedure is still quite popular, and generally reflects the type of roentgenology practiced in that community. There is no reason why a physician wishing to do his own x-ray work should not do so, if he has properly prepared himself. The information he can receive from the office use of the x-ray is often more helpful than that which he receives from that type of hospital x-ray department which is run largely for the benefit of the hospital treasury.

As it will soon require four years of postgraduate work before the radiologist is considered qualified to practice his specialty, it seems reasonable to expect the physician who intends to do his own x-ray work to devote a sufficient length of time in radiological training so that he may at least understand its fundamentals, dangers, limitations and indications before attempting to use it in his own practice.

Many efforts have been made in the past to elevate standards and correct abuses that have crept into the practice of radiology, but the individual radiologist can do little by himself. It is only by working as a group or as an organization that real progress can be made. The first educational effort along these lines occurred at the beginning of the War, when the Committee on Preparedness of the American Roentgen Ray Society, with the approval of the Surgeon General of the United States Army, undertook to standardize radiological procedures. The work of this Committee resulted in the publication of "The X-Ray Manual, United States Army," which is still a standard textbook on x-ray technic.

In June, 1923, a group of prominent radiologists met in San Francisco on invitation of Dr. Albert Soiland to consider the advisability of forming a new organization that could enlist the support of every leading radiologist in the country, in order to create better educational facilities, both graduate and undergraduate, to place the practice of radiology on a higher professional plane, to promote economic rights for all concerned, and to secure for the public protection against incompetent radiological practices. The outcome of this meeting was the formation of the American College of Radiology. The work of the College has been confined almost entirely to educational measures, believing that it is only through a better education of the radiologist, and a more sympathetic understanding of his problems by the medical profession and laity, that radiology could hope to advance and receive full recognition.

As members of the College were also members

of the American Medical Association and active in their local medical circles, it was only natural that there should have developed from the very beginning a close cooperation between organized radiology and the Council on Education and Hospitals of the American Medical Association. As a result of this cooperation, the Section on Radiology in the American Medical Association was established in 1925. Thus, after forty years of effort, radiology was officially placed on an equal footing with the other medical specialties.

It is impossible to estimate the importance of this action upon the future practice of medicine. It officially established the fact that radiology is a clinical branch of medicine and made it possible to keep the control of an important diagnostic and therapeutic agent within legitimate medical circles.

The fact that radiology was officially recognized by organized medicine did not correct long-established abuses within the specialty, or bring about radical changes in institutional practices, or solve the question as to what training a man should have in order to be qualified to specialize in radiology. Any physician with practically no knowledge of the fundamental principles of radiophysics, and the most meager training in interpretation of films, could still establish himself almost by acclamation as a full-fledged radiologist.

Much remained to be done in an educational way before radiology could be established in fact, as well as in principle, on an equal basis with the other branches of medicine. A more intimate association between the various departments of organized medicine and organized radiology has been encouraged and this has resulted in a number of conferences of representatives of the American College of Radiology, the Council on Medical Education and Hospitals of the American Medical Association, American College of Surgeons and the American Hospital Association. These meetings have been held in Chicago each February in conjunction with the Annual Congress on Medical Education. The educational effect of these conferences has resulted in a better understanding of the difficulties that have confronted radiology in the past, and of the problems which must be met in the future. It is now generally accepted that the practice of radiology is the practice of medicine, and more and more hospital authorities are accepting the fact that the relation of the radiologist to the hospital should be on the same basis as that enjoyed by other members of the staff. In most states, institutions do not have a legal right to practice medicine, which they do when they collect and retain fees for the professional services of the roentgenologist.

Probably the most important and far-reaching step that has yet been taken by organized medicine in the field of radiology was the formation of the American Board of Radiology in 1933. The formation of this Board has been almost universally approved by the radiologists of the country, and to date, approximately, 850 physicians have been certified. The Council on Medical Education and Hospitals has accepted the diplomates of the Board as the official list of radiologists in the United States, and will hereafter publish the list in the *Journal of the American Medical Association* instead of the Council's list heretofore published.

The formation of the Board has created a keener interest for better work on the part of radiologists. As the functions of the Board have become better known, there is resulting a more sympathetic appreciation of the radiologist's viewpoint by hospital boards and superintendents. The advantages of an approved radiological department are becoming more generally known and are resulting in an increased demand for competent, well-trained men.

It is difficult to see how this demand is going to be met within any reasonable time unless medical schools take cognizance of the fact and provide facilities for special postgraduate instruction. The field of radiology is as broad as medicine itself. It is intimately related not only to medicine and surgery, but to every specialty, besides covering a large field of its own in therapy.

The requirements of the American Board of Radiology conform with the essentials listed by the Council on Medical Education and Hospitals of the American Medical Association, in that a physician wishing to specialize in radiology must be a graduate of an approved medical school, serve one year as intern in an approved hospital, and three years in a radiological department recognized by the Council and Board as competent to provide satisfactory training in the field of radiology. This three-year period shall include intensive graduate training in pathologic anatomy, radiophysics, radiobiology, radiographic technic, fluoroscopy, correlation of roentgen findings with normal anatomical structures and pathological processes, the relationship

between roentgen findings and physical diagnosis, film interpretation and radiotherapy.

In the hospital number of the *Journal of the American Medical Association* last March there were listed by the Council on Medical Education and Hospitals 6,246 registered hospitals in the United States; 4,698 of these were listed as having x-ray departments, but only 3,686 had physician directors (notice they do not say radiologists). There were 1,012 hospitals with x-ray equipment, but no physician to use it.

What is the situation regarding the radiologists? In the last radiological number of the *Journal of the American Medical Association,* the Council published a list of 1,286 physicians practicing radiology in the United States. This may not be complete, as some may have failed to register, but it is approximately correct. Therefore, there is one radiologist to every three hospitals now equipped with an x-ray department. If only diplomates of the Board are considered, the ratio is one radiologist to every five hospitals.

The only way that this shortage of radiologists can be corrected is for more graduates of medicine to go into radiology. After 1938, to meet the minimum requirements which have been established by the American Board and approved by the Council on Medical Education and Hospitals, four years of postgraduate work will be required before a physician can appear before the Board for examination and certification. The number of radiologists available each year under this plan will prove entirely inadequate to meet the growing demand for experienced men. The American College of Radiology, through its Committee on Education, is no doubt giving this matter serious consideration.

The College has recently initiated an annual conference of teachers of clinical radiology, to meet in Chicago each February. It is hoped through this medium to establish more uniform and helpful methods of teaching radiology both to the undergraduate and graduate student.

If we are to fulfill our obligation of supplying good radiological service to our respective communities and to keep abreast of the developments that are rapidly taking place in the field of radiology, we cannot afford to be satisfied with our present status, but must continue to be students throughout our professional careers.

No specialty can rise above the educational qualifications of those who practice that specialty. If radiology is to keep pace with the other branches of medicine, it must offer attractions to the best type of medical graduates.

Radiology now holds a position in medicine it has never occupied before; it is recognized as one of the basic medical specialties, and offers to the recent graduate, who is willing to take time to prepare himself, an unequaled opportunity for creative work in probably the largest unexplored field in medicine today.

SKIN DISEASE AND INTERNAL MEDICINE*

By LLOYD W. KETRON, M.D.†
Baltimore, Maryland

Dermatology, unfortunately, in the early stages of its development, was concerned too much in the elaboration of complex divisions and subdivisions of cutaneous morbid pictures. The skin was looked at more as a detached, self-sustaining organ than as a part of the human body as a whole, assuming its share of important physiological and biochemical functions in health and disease. In the past few years, however, there has been a decided swing in the other direction, and now if a dermatosis cannot be explained on the basis of toxins from focal infections, gastrointestinal diseases, acidity, allergy or diseases of the ductless glands, it can often be safely disposed of in a neurogenous or psychogenous group.

Dermatologists over the country have written many articles emphasizing the importance of looking inwardly for the cause of skin disease, and some wish to be looked on as internists with a special interest in dermatology, regarding the skin as the great mirror which reflects evidence of dyscrasia and internal morbid processes.

It is not my desire to scoff at any efforts in this direction, for it must be evident to anyone that the skin is a part of the organism as a whole, sharing important general physiologic functions and morbid processes. It does differ, however, in one particular way from the other tissues and organs of the body. By virtue of its location as a protective covering, it is constantly brought into contact with all sorts of external irritants, both bacterial and chemical, which give rise to many dermatoses that are frequently erroneously attributed to some vague internal derangement.

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†Associate Professor of Dermatology, Johns Hopkins University School of Medicine; Dermatologist to the Johns Hopkins Hospital.

It must not be forgotten, also, that morbid processes in the skin may secondarily affect other organs of the body and that the cure must be brought about by attention to the seat of the disease rather than its remote manifestations.

In this brief paper, despite its title, I wish to emphasize especially the side of dermatology which has no important internal relationships because it is not uncommon for external therapy in this division to be entirely overlooked in the elaborate details of general internal surveys.

Let us briefly consider the various connections in which the skin may show disease.

(1) In the first place, it may be affected along with other organs and tissues as evidence of some general process usually of an infectious or neoplastic nature. In this group the skin may present the principal manifestation of the disease and knowledge of such manifestations is often necessary for diagnosis. For illustration tuberculosis, syphilis, scarlet fever, and the so-called lymphoblastomata may be mentioned. It is not uncommon that the first clinical evidence of Hodgkin's disease is an intractable pruritus and cases of leukemia may present skin nodules before any changes in the blood or internal organs are demonstrable. Another very important division of this group are the polymorphous erythemas whose internal relationships were first emphasized in this country by Osler. Here macular, papular or bullous effloresences are seen which may be of a very mild nature without clinical evidence of general systemic involvement, or there may be a grave toxemia with such serious damage that death results. While it is quite certain that in some instances these eruptions are due to known specific infection with such organisms as streptococci and the tubercle bacillus, the etiological agent in the majority of cases is unknown.

(2) In the second group are numerous skin disorders usually of the eczematoid type due to external irritants and the localized action of bacteria, insects or fungi. The importance of this group cannot be too strongly emphasized for, although its numerical subdivisions are few, the total number of cases is large. One often sees patients with a dermatitis on the neck or face due to furs or cosmetics who have been under treatment for one or both of the two usually meaningless terms, "acidity" and "nerves."

Cases of scabies are occasionally subjected to the punctures and scratches of the allergist and the bite of some insects may strongly resemble rashes often considered to be due to digestive disorders or dietary indiscretions.

Ringworm of the hands and feet was until relatively recently classified with the eczemas or pompholyx which were thought to be caused by everything from arthritism to food.

Acne vulgaris, the most common of all skin diseases, should be placed in the group of local infections, although factors of a local or general nature are necessary for its development. It is generally thought to be caused by errors in diet, digestive or menstrual disturbances, constipation, or glandular dysfunction. It is quite apparent, however, to any one who has studied the bacterial flora of the skin that the essential lesions of this disease are caused by these organisms. Their saprophytic growth in the follicular orifices is responsible for the comedones which usually entirely block the flow of the sebaceous glands. If erosion of the wall results they are liberated into the tissues often with other foreign material composing the blackheads and a superficial pustule or nodule results, depending on the depth at which the blocking has occurred. Although acne cannot be produced experimentally, the intracutaneous injections of these organisms either dead or alive will cause inflamed nodules or abscesses in both man and animals. When one stains a section from a fresh acne pustule for bacteria and finds the leukocyte filled with acne bacilli or staphylococci it is very difficult to ignore their significance. It is quite true that these organisms live to a certain extent on all skins where there is sufficient sebaceous material for them to feed on, and it is quite natural that they should reach their maximum rapidity of growth at puberty when the glands are most active.

The fact that the disease does not develop in all people with greasy skins shows that special conditions are necessary for the organisms to grow at the proper rate to cause follicular blocking. There must be a proper balance between bacterial growth and rapidity of the flow of sebaceous matter. It is quite possible that in some cases an excessive flow of sebum may prevent acne if the growth rate of the bacteria is limited. The composition of the secretion, that is, whether or not it is a good culture medium, must determine the possibilities of bacterial growth on any skin, and it is in this respect that various conditions of internal origin play an important role.

Errors in diet have long been considered etiologic factors in acne but, other than tradition, there is little to support these ideas. Many attempts have been made to incriminate carbohydrate intolerance with little success, and indeed this whole conception has recently been given a

blow by the work of Crawford and Swartz, who were able to note considerable improvement in a series of patients who were given daily intravenous injections of glucose and placed on a high carbohydrate diet.

Dysfunction of the gonads is now receiving considerable attention as an etiologic factor in acne mainly because of some apparently good therapeutic results from the use of anterior pituitary sex hormone, but when one recalls the complete failure of this preparation in the treatment of baldness after its first glowing appearance one awaits further reports on its use in acne with little enthusiasm. In some recent work, Lee McCarthy found little evidence of its favorable action in the treatment of this disease.

(3) The skin may be diseased within itself without internal implication, due to some inherited weakness, localized metabolic disorder or other unknown processes. Illustrative of the first are epidermolysis bullosum, congenital ectodermal defects, ichthyosis, and so on.

It is quite possible that pemphigus may also belong in this group. In this disease the principal pathologic phenomenon is lack of cohesiveness between the epithelial layer and the corum. This is so striking at times that by a mere sliding stroke of the finger with pressure the epidermis may be peeled off the underlying papillae without even rupturing their capillaries. Patients affected with this disease have never known, in its early stages, any evidence of internal disorder by our present methods which could be interpreted as of etiologic importance. Later on, however, the general health becomes impaired and there may be involvement of internal organs, due probably to absorption through the denuded skin of toxic products from autolysed tissues and secondary infection.

Psoriasis also is very probably due to some local metabolic disorder of the epidermis for, despite innumerable attempts, no abnormalities of the internal organs, glands or general metabolic functions have ever been found consistently present in this disease. It is quite true that it may tend to be more severe when associated with rheumatism or thyroid dysfunction, but this is no more proof that these affections have an etiologic relationship to it than that diabetes is the immediate cause of boils. Psoriasis, perhaps, more than any other skin disorder, has offered to investigators an opportunity, based on therapy, for a wide diversity of opinions as to its etiology. This is not because anything important has ever been discovered of direct etiologic significance, but because the disease normally fluctuates so much in the intensity of its manifestations that it is not particularly difficult to get a series of cases when not properly controlled showing, apparently, good results from almost any therapeutic procedure from surgical operations to the administration of all sorts of vaccines, drugs, and glandular products. Certain cases may clear up after the removal of an infected gallbladder or other surgical procedures which relieve diseases of other organs, but this only suggests that such affections may have been contributing factors, not direct causes.

(4) In the fourth group may be placed various skin affections of unknown etiology which are usually considered to be of internal origin, but where such relationships are for the most part guess work. Here may be mentioned such conditions as eczema, lichen planus, dermatitis herpetiformis, and so on. These affections are frequently thrown together as if well defined clinical, and undoubtedly etiologic, entities did not exist, and one often sees glowing reports of the cure of such widely divergent affections as acne rosacea, eczema and psoriasis attributed to everything from various surgical operations to the control of emotional upsets.

The most common term employed at times to explain the cause of all cutaneous disorders is "acidity" or its modifications, "acid in the blood," "acid conditions." This idea is firmly implanted in the minds of the laity and one is led to believe also the physician, if patients correctly report conversations with them. I have often thought, however, that this explanation was in the majority of cases a subterfuge to avoid a confession of ignorance. I have frequently felt like resorting to it myself, for it abundantly satisfies the patient and saves many embarrassing questions. The fact remains, however, that variations in the gastric acidity have never shown any important relationship to any skin affection, with the probable exception of rosacea and here hypoacidity is the rule rather than an increase in the acid content. There is, also, no evidence clinically or from blood examinations that any skin affections depend on an acidosis.

An excess of uric acid in the blood as a cause of skin disease, especially eczema, has been the subject of much discussion for a great many years. Although some investigators have found what they considered increased uric acid values in eczema the results in general are not convincing. Michael was unable to show that either uric acid, urea or creatinine were dermal irritants or have a definite photosensitizing effect. In two severe cases of eczema, increasing the uric acid

content of the blood by intravenous injection did not aggravate the eruption.

Another very commonly offered diagnosis for almost any skin affection where the etiology is unknown is "nerves." This term, as well as the "too much acid" one, is also highly pleasing to the patient and completely satisfies his curiosity. The truth, however, is that there are very few skin disorders that are directly due to disease of the nervous system, nervous exhaustion, psychopathic states or psychoses. It is quite true that nervous exhaustion or shock may precipitate certain diseases which are dormant or aggravate them in an active state, but this relationship is not limited to skin affections alone. Conversely, it is also a fact that various cutaneous disorders, especially those associated with severe pruritus, may cause nervous exhaustion with gastro-intestinal or other involvement, and while it is necessary to treat all of these important symptomatic expressions, proper care of the skin is frequently neglected and "the cart placed before the horse" when the etiology is considered.

There is growing evidence that many cutaneous diseases, especially in the eczema group, are due to allergy, that is, the skin has become sensitized to some substance harmless to the normal skin. This relationship can readily be shown where the irritant is of external origin by the so-called patch test, but when the origin is apparently internal the difficulty is much greater. Some cases appear to be caused by articles of diet, if positive skin tests to certain food are to be relied on, but unfortunately in the large majority of cases the elimination of these foods does not cure the skin disorder.

Substances from the intestinal tract or various internal foci of infection may be responsible for some cases in this group, but little is known at the present of such relationships.

In conclusion may I say that in this very brief and incomplete review it has been my aim to emphasize the fact that all skin affections are not dependent for their origin on some internal disorder. I would in no measure minimize the importance of a general study when indicated, but only wish to warn against a neglect of local causes and local treatment in favor of unsupported and traditional internal measures. In general, much better results, in our present state of knowledge, may be obtained in the therapy of skin diseases as a whole by giving careful attention to the visible manifestations of the disease than by trying to correct such vague general disorders as acidity, biliousness, autointoxication, nerves, or the resort to indiscriminate dieting.

FOOD ALLERGENS*

A STATISTICAL ANALYSIS OF FORTY-THREE CASES RELATIVE TO THE GENETIC CLASSIFICATION OF FOODS

By ORVAL R. WITHERS, M.D.
Kansas City, Missouri

As an aid in the therapeusis of food allergy, Vaughan, and later Ellis, suggested the genetic classification of foods. This has resulted in clinical inferences and impressions without adducing factual information. To determine whether the clinical evidence supports this hypothesis, it was contemplated to analyze the data bearing upon this point obtained from fifty-five patients clinically sensitive to the vegetable foods. Before doing this, however, these patients were carefully requestioned concerning their food sensitivity. They were also given a printed copy of the botanical classification of edible plants and requested to check their allergenic foods. As a result of this investigation, twelve patients were excluded from the original series because the verity of their statements could not be established. Only those were selected whose accuracy and cooperation were demonstrated during the clinical management of their case.

This study consists of an analysis of 43 cases of clinically proven vegetable food sensitivities. Twenty-four were female and 19 male, with ages from 18 months to 67 years. Nearly 80 per cent of these patients suffered with chronic vasomotor rhinitis, bronchial asthma or a combination of these conditions. Fifty-three per cent were pollen sensitive patients, but in only one instance was hay fever the primary complaint. Gastro-intestinal allergy as a complication occurred in seven patients, or 16 per cent, while atopic eczema was the only form of allergy in two patients. In the total group of forty-three, one patient was sensitive to three foods, only one of which was classified as a vegetable food, and therefore used in this report. Another patient was clinically sensitive to twenty-nine foods, twenty-five of which belonged to the vegetable classification and were distributed in ten botanical families. There was a total of 422 clinically proven food sensitizations with a multiple sensitivity averaging 9.8 per cent per patient. Each individual was tested to all the foods listed

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*From the Allergy Clinic of the Department of Medicine, University of Kansas School of Medicine.

unless otherwise designated and the clinical reactions in each case were quite definite on repeated trial. The total number of clinical reactions were divided into their respective botanical families for further consideration.

Fig. 1

Patient No.	Potato	Tomato	Egg Plant	Green Pepper	
2	X				
4	X				
6	X				
7	X				
25	X				
33	X				
34	X				
5		X			
8		X			
10		X			
12		X			
15		X			23/1
17		X			
20		X			
21		X			
22		X			
24		X			
27		X			
29		X			
35		X			
41		X			
42		X			
18				X	
13	X	X			
26	X	X			
31	X	X			5/2
38			X	X	
37		X		X	
32	X		X	X	1/3
19	X	X	X	X	1/4
	12	20	3	5 = 40	

SOLANACEAE

Thirty patients were sensitive to this group with a total of forty clinical reactions. Twelve were clinically sensitive to potato and twenty to tomato; only four reacted to both potato and tomato. 23/1 indicates that twenty-three patients are sensitive to one food, 5/2 indicates that five patients are sensitive to two foods, etc.

Solanaceae.—The greatest percentage of patients reacted to the solanaceae or potato-tomato group. Of the thirty patients, or 70 per cent, reacting to this group, twenty were clinically sensitive to tomato and twelve were sensitive to potato. In the whole group, only four reacted to both potato and tomato. Less than 50 per cent of the group were clinically tested to egg plant and green pepper, thus invalidating the statistics for these foods. However, two of the three patients that reacted to egg plant reacted to potato and green pepper; one of them experienced vasomotor rhinitis from all four members of the group. Five patients were clinically sensitive to green pepper, three were sensitive to egg plant, two reacted to potato and two to tomato. In this group, single sensitivity was the rule, usually to tomato.

Gramineae.—The gramineae ranked second with twenty-seven patients, or 63 per cent, being sensitive to the cereal family. There were fifty-three clinical reactions to members of this group; twenty-four reacted to wheat, eight to rye, three to barley, three to oats, five to corn, and eight to rice.

Considering the wheat sensitivities more in detail, it is noted that of the twenty-four that reacted to this cereal, eight reacted to wheat only, eight reacted to rye, six to rice, five to corn, three to barley, and three to oats. Only two patients were clinically sensitive to wheat, rye, and barley.

Seven patients reacted to corn and one of these to corn only. Five of the seven were sensitive to wheat, two to rice, two to rye, and one to barley.

Eight of the twenty-seven patients reacting to cereals reacted to rice. Six of these patients were sensitive to wheat and two to corn, oats, and rye. One patient reacted to rice only. There were no reactions to barley. Only three patients were sensitive to oats; all of these were sensitive to wheat, two were sensitive to rice, one to rye, and none to corn.

In reviewing the group of twenty-seven cereal sensitive patients it is noted that ten reacted to only one food (eight to wheat) while two reacted to four of the six members of the family. In the remaining fifteen patients, there was no constant combination except that those sensitive to rye were also sensitive to wheat. Wheat was by far the most common etiological factor. Multiple sensitivity was not present to a great extent in this group. Ten patients reacted to only one cereal, ten others reacted to two, five reacted to three, and only two patients reacted to four. No patient reacted to all six cereals.

Leguminosae.—The third family to be considered is the bean family. Twenty-two patients, or 51 per cent, reacted to this group with a total of sixty reactions. Of this number sixteen reacted to peanuts, fifteen to navy bean, eleven to peas, nine to lima bean, and nine to string bean. Soy bean, lentil, kidney bean and black-eyed pea were not included in this study. Black-eyed pea

Fig. 2

Patient No.	String Bean	Lima Bean	Navy Bean	Peas	Peanuts	
7					X	
13					X	
16					X	5/1
20				X		
24				X		
2		X	X			
14			X		X	
31	X			X		
33			X		X	6/2
34			X		X	
35	X			X		
10	X		X		X	
15		X	X		X	
26			X	X	X	4/3
42		X	X		X	
1	X		X	X	X	
4	X	X	X		X	4/4
6	X	X	X	X		
19		X	X	X	X	
25	X	X	X	X	X	
32	X	X	X	X	X	3/5
40	X	X	X	X	X	
	9	9	15	11	16	= 60

LEGUMINOSAE

Twenty-two patients were sensitive to this group with a total of sixty reactions. Multiple sensitivity is the rule and the most common reactor is peanut. 5/1 indicates that five patients are sensitive to one food, 6/2 indicates that six patients are sensitive to two foods, etc.

could not be classified botanically. Soy bean is seldom used in this area except in a few prepared foods. Lentil is used only to a limited extent. Kidney bean is used moderately in this area, but not often enough by these patients to be included in this report.

Sixteen patients were sensitive to peanuts and of this number six reacted to peas, six to string bean, seven to lima bean and ten to navy bean. Fourteen patients were sensitive to navy bean. Of this number, six reacted to peas, six to string bean, eight to lima bean, and twelve to peanuts. Eleven patients were sensitive to peas. Of this number five reacted to lima bean, six to peanuts, six to navy bean and six to string bean. Nine patients were sensitive to lima bean. Of this number, five reacted to peas, five to string bean, seven to peanuts and eight to navy bean. Nine patients were sensitive to string bean. Of this number, five reacted to lima bean, six to peanuts, six to peas, and six to navy bean.

In reviewing the legume group of twenty-two patients, it is noted that only three reacted to all five foods and five (three to peanut and two to pea) reacted only to one member of the group. There was no constant combination in the remaining fourteen patients, although it appears that sensitivity to string bean indicates multiple sensitivity within the group and that peanut and navy bean sensitivity is likely to occur in the same patient. In this family, multiple sensitivity is the rule and peanut is the most common etiological factor.

Cucurbitaceae.—The cucurbitaceae or watermelon family is the next to be considered. Nineteen patients, or 42 per cent, were responsible for thirty-two clinical reactions. Of the thirty-two reactions, fifteen were to watermelon, ten to cantaloupe, and seven to cucumber. There were no clinical reactions to pumpkin or squash and these foods should not be included, as they were clinically tested by less than half of the patients. Of the fifteen patients that reacted to watermelon, six reacted to watermelon only, eight reacted to cantaloupe and four to cucumber. Of the ten patients that reacted to cantaloupe, eight were clinically sensitive to watermelon and four to cucumber. One patient was sensitive to cantaloupe only. Seven patients were sensitive to cucumber, and of this number four reacted to watermelon, four to cantaloupe, and three reacted to both cantaloupe and watermelon. Two patients were sensitive to cucumber only. About 50 per cent of those reacting to watermelon did so only during the fall pollen season.

To summarize, nine patients reacted to one food (six watermelon), while three reacted to all three of the foods tested. Seven patients were sensitive to two foods, and five of these were to watermelon and cantaloupe. Multiple sensitivity was present in about 50 per cent of the patients, as ten of the whole group of nineteen were sensitive to more than one food (seven to two and three to all three foods). Watermelon was the most frequent etiological factor.

Drupaceae.—The apricot-peach group was the fifth most frequent reactor with fifteen patients, or 35 per cent, and thirty-three clinical reactions. Of the thirty-three reactions, twelve had symptoms resulting from the ingestion of peach, seven from apricot, six from plum, five from cherry, and three from almond. Every patient of this series was not questioned specifically concerning his clinical sensitivity to prune, but the four that were sensitive to prune were likewise sensitive to plum. Fifteen patients were sensitive to thirty-three foods in various combinations.

Fig. 3

Patient No.	Apricot	Peach	Plum	Almond	Cherry	
16		X				6/1
20		X				
30		X				
36		X				
32					X	
18	X					
8	X	X				3/2
14	X				X	
15		X			X	
12		X	X		X	3/3
31	X	X	X			
33		X	X		X	
1	X	X	X		X	3/4
5	X	X	X		X	
42	X	X	X		X	
	7	12	6	3	5	= 33

DRUPACEAE

Fifteen patients showed thirty-three clinical reactions to the five foods of this group. Multiple sensitivity was variable. Sensitivity to cherry seems to indicate multiple sensitivity within the family. Peach was the most common reactor in the group. 6/1 indicates that six patients are sensitive to one food, etc.

Twelve patients were sensitive to peach and of this number, one reacted to almond, two to peach only, five to apricot, five to cherry, and six to plum. Seven patients reacted to apricot and of this number, one reacted to almond, three to cherry, four to plum, and five to peach. Six patients were sensitive to plum and of this number, one reacted to almond, three to cherry, four to apricot, and six to peach. Five patients were sensitive to cherry and of this number, three reacted to plum, three to apricot, and five to peach. Three patients were sensitive to almond and of this number, one reacted to almond only, one to peach, and one to apricot.

In reviewing the entire group of fifteen patients, three reacted to four foods, while six reacted to only one food. In the remaining six patients multiple sensitivity was variable. It appears that the sensitivity to cherry indicates multiple sensitivity within the group and that apricot, peach and plum sensitivity, especially the latter two, are likely to occur in the same patient. No patient sensitive to cherry was sensitive to almond and no patient reacted to all five members of the group. Peach was the most common etiological factor.

Malaceae.—The malaceae, or apple-pear family, was the sixth most frequent reactor. Of the thirteen patients, or 31 per cent, that reacted to this group, eleven reacted to only one member of the group. Nine patients were clinically sensitive to apple, seven being sensitive to this food alone. Six patients were sensitive to pear and four of these were sensitive to pear only. Of the thirteen patients, only two were clinically sensitive to both apple and pear.

More than half of the patients who reacted to apple and pear of the malaceae group reacted to peach of the drupaceae group. This may indicate a relationship between these two families.

Rutaceae. — The seventh highest number of patients reacted to the orange-lemon family with a total of eleven, or 26 per cent, who were responsible for twenty-one clinical reactions, of which ten were to orange, six to grapefruit, and five to lemon.

The interrelation of the foods in this group is as follows: Ten patients were sensitive to orange. Of this number, four reacted to orange alone, five to grapefruit, five to lemon, and four to grapefruit and lemon. Six patients were sensitive to grapefruit, and of this number none reacted to grapefruit alone, five to orange, four to lemon, and four to orange and lemon. Five patients were sensitive to lemon, and of this number none reacted to lemon alone, five to orange, four to grapefruit, and four to orange and grapefruit.

Fig. 4

Patient No.	Apple	Pear	
3	X		7/1
8	X		
15	X		
21	X		
23	X		
36	X		
41	X		
31	X	X	2/2
33	X	X	
2		X	4/1
25		X	
40		X	
42		X	
	9	6	= 15

MALACEAE

Thirteen patients reacted to this group. Only two reacted to both apple and pear. 7/1 indicates that seven patients are sensitive to one food, etc.

Of the whole group of eleven patients, five were sensitive to one food, while four were sensitive to all three members of the family. The remaining two were sensitive to two foods, both to orange and one each to lemon and grapefruit. Multiple sensitivity existed in over half of the patients. Sensitivity to lemon seems to indicate multiple sensitivity within the group. Orange was the main etiological factor of the group.

Liliaceae.—Eleven patients, or 25 per cent, reacted to the onion group. There were fifteen clinical reactions, and of these nine were to onion, five to asparagus, and one to garlic. Of the nine patients who reacted to onion, six reacted to onion alone and three to asparagus. Of the five patients who reacted to asparagus, two reacted to asparagus alone and three to onion. The patient who reacted to garlic also reacted to onion and asparagus. Less than one-fourth of the patients in this series was tested to garlic.

Of the eleven patients, eight reacted to one food only (six to onion and two to asparagus), while three patients reacted to both onion and asparagus. One of these was also sensitive to garlic. In this group single sensitivity was the rule and sensitivity to asparagus occasionally indicated sensitization to onion as well.

Juglandaceae. — The *juglandaceae* or walnut-pecan group is the next highest reactor with a total of nine patients and twenty-one clinical reactions. Of the twenty-one reactions, seven were sensitive to English walnut, six to black walnut, four to pecan, and two to hickory nut. Of the seven patients that reacted to English walnut, one reacted to English walnut only, six to black walnut, two to pecan, and two to hickory nut. The six that reacted to black walnut also reacted to English walnut, two reacted to pecan, and two to hickory nut. Of the four patients sensitive to pecan, two reacted to this nut alone and two others to both black and English walnut. Both patients sensitive to hickory nut were also sensitive to black and English walnut, while none reacted to pecan. Less than half of the forty-three patients were clinically tested to all the foods in this family.

Of the nine patients, six reacted to two or more foods, while three reacted to only one member of the group. It appears that a crossed relationship may be close in this series and that English walnut and black walnut sensitivity are often found in the same patient.

Miscellaneous Groups.—Eight or a less number of patients reacted to the following botanical families:

Banana of the *musaceae group* produced symptoms following ingestion in seven of the forty-three patients examined.

Eight patients were clinically sensitive to the *vitaceae* or raisin group. No distinction was made between the various kinds of grapes or raisins used. In all cases the symptoms were distinct and occurred within fifteen minutes to six hours following ingestion.

Rosaceae family consists of strawberry, blackberry, black and red raspberry. Since three-fourths of the patients failed to test this group, the statistics are not complete for this family. However, seven of the patients reacted to strawberry and one reacted to every member of the group, while another reacted only to red raspberry and strawberry.

The *cruciferae* or cabbage-turnip family, consisting of eleven members, is the largest to be considered in this report. Four are commonly used in this section, namely, radish, cabbage, cauliflower and brussell sprouts. Four others, namely, horse radish, turnip, rutabaga and broccoli, are used occasionally. Three foods rarely used are water cress, kale, and kohlrabi. The majority of patients did not test the entire group clinically, therefore the statistics are not complete. It is surprising to note that only seven patients were clinically sensitive to the common foods of this group.

There were four clinical reactions each to turnip, cabbage and cauliflower and two to brussell sprouts. Of the four that reacted to cabbage, one reacted to cabbage alone, three to cauliflower and two to brussell sprouts. Both of these reacting to brussell sprouts also reacted to cabbage and cauliflower. Of the four patients that reacted to cauliflower, one reacted to cauliflower alone, two to brussell sprouts, and three to cabbage. Therefore, regardless of the large family, it appears, in this small series at least, that there is a close relationship between cabbage, cauliflower and brussell sprouts.

Pineapple belongs to the *bromeliceae* family. Five patients were found to be clinically sensitive to this food. It may be only a coincidence, but three of the five patients sensitive to pineapple were also sensitive to the members of the closely related *palmaceae* family.

Six patients were clinically sensitive to the *palmaceae* or coconut-date family. Four patients reacted to coconut and two patients reacted to dates.

Five patients reacted to the *polygonaceae* family. All of these reacted to buckwheat and three

reacted to rhubarb. The three that reacted to rhubarb also reacted to buckwheat.

Four patients reacted clinically to the *chenopodaceae* family. Since swiss chard is rarely used in this region, it was seldom found in the diet. All four patients reacted to spinach and two reacted to beets. Those reacting to beets also reacted to spinach. According to genetic classification of foods, the chenopodaceae family is closely related to the polygonaceae group. It is interesting to note that three of the four patients who were sensitive to spinach were also sensitive to buckwheat.

Three patients were clinically sensitive to olive and sweet potato, two were sensitive to lettuce and fig and one was sensitive to cottonseed and okra.

COMMENT

It appears that a patient who is sensitive to one food in a botanical family has an equal chance of being sensitive to others in the same family. This may depend upon the food to which the patient is clinically sensitive as certain foods such as string bean, cherry and lemon indicate multiple sensitivity in their respective groups. However, if he were sensitive to the most common etiological factor of the family, he is less likely to be sensitive to other members of the group. In this series, tomato, wheat, peanut, watermelon, peach, apple, orange, onion and English walnut were the most common etiological factors in their respective families.

According to the statistics presented, multiple sensitivity is more pronounced in some botanical families than in others. It is most pronounced in the bean-pea family and is present to a lesser extent in the apricot-peach, walnut-pecan, orange-lemon, watermelon and cereal families. There was little or no relationship between the members of either the *malaceae* group or the *solanaceae* group. Over half the patients reacting to the *malaceae* group reacted to peach in the *drupaceae* group. This may indicate multiple sensitivity between these two closely related botanical groups. Practically no relationship was shown to exist between potato and tomato of the *solanaceae* family. However, a closer relationship was shown to exist between egg plant and green pepper sensitive patients, but the number is too few to be of statistical value.

The symptoms produced in this series were predominantly those of respiratory allergy, namely, chronic vasomotor rhinitis and asthma.

Twenty-six per cent of the patients knew or suspected certain foods which later proved to be the cause of their symptoms. Usually, the clinical reaction was definite and occurred soon after ingestion. Peach, watermelon, orange and English walnut were most frequently suspected.

Twenty-one per cent of the patients could tolerate certain cooked but not raw foods. Cabbage, apple and onion were the most frequent foods to cause symptoms when eaten raw. One patient experienced vasomotor rhinitis following the ingestion of fresh corn, but not corn meal. Another patient could take cooked apricot or fig, while the dried fruit produced asthma.

It is realized that a criterion cannot be established by the clinical analysis of a small number of patients. However, if others would report their observations, eventually the statistics could be more accurately estimated.

REFERENCES

1. Vaughan, Warren T.: Food Allergens. 1. A Genetic Classification with Results of Group Testing. Jour. Allergy, **1**:385, 1930.
2. Ellis, Ralph V.: A Rational Grouping of the Food Allergens. Jour. Allergy, **2**:246, 1931.
3. Vaughan, Warren T.: Food Allergens. 2. Trial Diets in the Elimination of Allergenic Foods. Jour. Immunology, **20**: 313, 1931.
4. Mix, A. J.: Personal communication.

927 Argyle Building

DISCUSSION (*Abstract*)

Dr. Hal McCluney Davison, Atlanta, Ga.—Dr. Withers has accomplished a great task and given us an interesting and valuable piece of work. His work has been carefully done on patients who were cooperative and mentally capable of accurate observations, and he has depended entirely upon the clinical food test which gives the most accurate evidence of food sensitivity.

Our observations made during treatment of patients tend to substantiate his findings and his conclusions. We have found that seldom are there positive skin reaction to all the various foods of any group, and I cannot recall any patient who could not take some one member of any group without production of symptoms. Cases most nearly approximating a 100 per cent group sensitivity have been cases of eczema with sensitivity to the bean-pea family. We had not found the key foods for the different groups. His findings in this matter will be of practical assistance in the treatment of our patients.

Dr. Leslie N. Gay, Baltimore, Md.—Although he does not mention it in his paper, I assume that Dr. Withers used no skin tests in the diagnosis of the various food reactions of his patients. Instead he depended upon reactions to individual items of their diets. To me this seems a very difficult procedure and I cannot understand how he can be absolutely certain that a food eaten at breakfast might be responsible for a mild attack of asthma which the patient develops late that afternoon or the next day.

I should like him to explain just what the mechanics

are of his study of a patient whom he suspects of having some food sensitivity.

Dr. Withers (closing).—There are no signs or symptoms which classify the atopic diseases etiologically, therefore food should always be considered a potential factor until it is disproved. Food sensitization is sometimes difficult to prove. Many variable factors must be considered; polysensitization, the degree of sensitivity and the reaction time are probably the more important.

Food sensitization in the cases presented was established by clinical trial and a knowledge of the variable factors, together with skin tests, a food diary, the genetic classifications of foods and the leukopenic index.

Usually the patient will assist in detecting allergenic foods, especially if he has been properly instructed in the interpretation of his symptoms and understands the importance of cooperation. If the doctor suspects that the patient has not interpreted his symptoms correctly the questionable food should be retested when the patient is symptom-free or as nearly so as possible.

Each patient considered in this report has been carefully studied over a period of from one to six years. The clinical symptoms to various foods were repeatedly demonstrated by deliberate feeding.

THE PROPER CRITERIA FOR LIP READING RECOMMENDATION*

MEDICAL AND EDUCATIONAL CONSIDERATIONS

By MOSES L. BREITSTEIN, M.D.†
and
OLIVE WHILDIN, PH.D.‡
Baltimore, Maryland

I believe I can take it for granted that you all recognize the great value of lip reading instruction and, as physicians, welcome the growing cooperation between health and educational authorities for the welfare of the deafened child. I should like to say a brief word of appreciation of the splendid cooperation which exists between the Health Department and the Department of Education in Baltimore. It is this cooperation that has made possible whatever progress we have made in the education of deafened children and has helped materially in what we like to call our program for the prevention of deafness.

For those of you who may expect some precise and definite rules for the guidance of the otologist in recommending lip reading instruction, I fear this presentation will be a keen disappointment. As otologist to the Baltimore Health Department, I have been privileged in the course of almost ten years to examine and guide approximately thirteen thousand school children who have been suspected of deafness. From this experience, I am convinced that it is not wise to set hard and fast rules by which the percentage of hearing loss alone determines the advisability of lip reading instruction.

We have been guided in our work by the general plan to keep a child in his normal educational environment as long as possible. There is, of course, no problem in those cases of obvious severe loss of hearing, regardless of cause. From the medical point of view, there need be no difficulty in recommending lip reading in a case of advanced hearing defect due to meningitis, otosclerosis, chronic purulent otitis media, or any definite nerve deafness. The problem, however, does become a real one in the guidance of a much larger number of children with a moderate or questionable deafness. It is this group which predominates. It is characterized by the child whose parent or teacher has noticed no practical hearing difficulty. The case is brought to the attention of the otologist by the routine testing with the 4-A audiometer. There follows then an ear, nose, and throat examination and a further detailed hearing test, including the 2-A audiometer. I am sure it is unnecessary to remind this audience of the unreliability of a single 4-A or 2-A audiometric test, especially in children. We repeat the 2-A test in any suspected case at varying intervals, and no diagnosis based on the nature of the hearing loss is made until three successive tests of close similarity are obtained.

It may be said that the question which confronts every physician and every teacher when a child is found to have impaired hearing is whether or not some provision should be made for lip reading instruction. This is a very important question, for it involves vital psychologic and social problems for the child and great expenditure of time and money by the school. There are various opinions expressed as to the advisability of recommending lip reading for the hard of hearing. These opinions vary from those who believe that every child, regardless of the amount of hearing loss, should have lip reading, to the ultra-conservative who are afraid that the practice of lip reading might discourage the use of the residual hearing.

Lip reading may be regarded both as preventive and as remedial. By preventive we mean the prevention of the child from becoming a social and economic problem to himself and to

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†Instructor in Otolaryngology, Johns Hopkins University School of Medicine; Otologist, Baltimore Health Department.

‡Director of Education for Handicapped Children.

society. When it is recommended as a preventive measure the most dominant guide must necessarily be the nature and degree of the hearing loss of the child. When it is considered a remedial procedure, other factors than hearing loss must be taken into account.

After examinations and hearing tests have established the diagnosis of permanent or progressive deafness, the problem of lip reading must be immediately settled. There are several questions which must be answered before a decision can be reached:

(1) Is the deafness monaural or binaural?

(2) Does the loss of hearing lie in the speech range?

(3) Is the child working up to the level of his ability in school?

(4) Is he happily adjusted in his class, socially and physically?

(5) Is his behavior natural and acceptable?

(6) Is there any indication of deafness in his speech?

The answers to these questions will determine the child's need for lip reading.

In considering monaural and binaural deafness and the need for lip reading, it can readily be seen that a child with deafness of both ears is more likely to be a candidate for lip reading than one who has one good ear. In cases of monaural deafness it has been found that many children are not at all handicapped while others are at a great disadvantage when improperly seated or when they are in a crowd. Asking the child for his opinion does not solve the problem, but watching him closely to check upon unusual posture and examining his school performance for possible weaknesses will point the way to the proper recommendation. We try to follow the general rule in these cases of not disturbing the normal educational environment. We have the child report at regular intervals for retesting, particularly of the less involved ear.

Obviously, a hard of hearing person is handicapped only when he is unable to comprehend connected language through the medium of hearing. A child showing fairly good hearing from twenty to two thousand cycles and a serious loss in the upper range will not need lip reading as badly as the child with conditions reversed. Thousands of audiograms reveal that it is more likely that the loss of hearing will be more or less uniform from 64 to 8,192 cycles and the child's inability to hear certain sounds will be marked. Unfortunately, there is no adequate machine that will test a person's ability to hear speech; consequently either a quick hearing intelligibility test must be given, or a laborious testing out for various combinations of sounds made. It will be agreed, however, that it is only when speech given in a normal tone is not readily understood through the ear, in spite of tonal test results, that there is a need for something to supplement this failing, namely, lip reading.

A child who is not working up to the level of his ability in school should be studied carefully to ascertain the reason. If he is of normal intelligence and is a year or more retarded, it may be due to either unsatisfactory behavior traits, poor work habits, or inferior teaching. Any of these may cause failure when failure is unnecessary. Added to impaired hearing they will make the child a problem in any class room. Impaired hearing alone may cause retardation when the class room discussion is not heard, even though the teacher herself can be understood by the child.

If a child with poor hearing is found to be doing unsatisfactory school work and all other findings have been ruled out as causative factors, the deafness alone is sufficient reason to recommend lip reading as a remedial course.

A child who is not happy in his class room nor on the school playground is indeed a problem. Our efforts to socialize the child act as a boomerang in the case of those who want to play, but who are not included because they are not sufficiently alert. Anything which will improve his well-being and add to his general adjustment should be done.

The lack of adjustment in the school or home is likely to produce unfavorable behavior. A child who finds that he is always wrong, or that others laugh at his peculiar mistakes, will soon be on the defensive. He may show this in various ways: by deliberately getting into trouble so as to be the center of attention, by fighting, or by going to the other extreme of withdrawing with a book from all but the most necessary contacts. Such unusual behavior in a child who is hard of hearing may be eliminated by the use of lip reading.

Non-conductive deafness and prolonged conductive deafness show their effect in the voice

and in consonant substitutions. Hearing affects voice. The loss of resonance and inflection is marked among the hard of hearing. The inability to hear certain sounds causes the child in the course of time to forget to reproduce these sounds. Through lip reading he is helped to see them so that they are constantly kept in mind.

We cannot over-emphasize the necessity of follow-up and retesting in any suspected case of deafness. Our studies of individual cases covering periods as long as five and six years give the most surprising findings. We have had cases in which the hearing tests indicated a progressive deafness and in which the degree of hearing loss was sufficient to warrant lip reading instruction. In this group there have been some instances in which, after follow-up covering several years, there has been a spontaneous improvement in the hearing to such a degree that lip reading instruction has been discontinued. We have had other cases in which the hearing loss has been limited to the high tones, 2048-4096-8192, and in which bone conduction was shortened. Follow-up in some of these cases has shown the defect to remain stationary for five or six years. In other cases of this type there has been a spontaneous improvement without any treatment. In still others the findings have been what we all would have suspected in the first place, that is, a progressive and increasing deafness after several years.

Our experience with chronic purulent otitis media has been what one would expect. In those cases in which the destructive process has not advanced too far, treatment, either local or operative, which has improved the local ear condition, has likewise improved the hearing.

It is unsatisfactory to attempt to state any general standards which would apply to all cases of deafness. Each case is individual from one aspect or another and must be considered individually. We should hesitate to subscribe to any general rule having as its basis the percentage of hearing loss alone as the proper criterion for the recommendation of lip reading instruction. Repeated hearing tests, patient follow-up studies, the degree and the tonal range of the hearing loss, school progress, social adjustment, behavior and speech habits are the most important observable factors in determining whether a hard of hearing child should be recommended for lip reading instruction.

THE BASIS OF SELECTION OF MEDICAL STUDENTS*

By ROBERT WILSON, M.D.
Charleston, South Carolina

With applications for admission into medical schools far in excess of the capacity for adequate instruction and greatly exceeding the need for physicians, the selection of those who are most fitted for successful careers as students and practitioners has become an important and very difficult administrative problem. At present there appears to be no completely satisfactory solution. The significance of character and personality as well as intellectual ability has been emphasized frequently and the soundness of considering these qualities as basic must be acknowledged; but there is no yardstick available by which they can be measured. The real test of character comes only with the inevitable experiences of life, its struggles, temptations, disappointments and disillusionments; and the reaction to these experiences cannot always be foretold. There is likewise no trustworthy criterion of personality. Judgment is a matter of individual impression and is too dependent upon this personal factor to be of material value in determining promise for satisfactory scholastic work, or for a successful medical career. The applicant's urge toward medicine which is often adduced by himself or his parents as an indication of fitness may be dismissed with its mere mention.

The basis of selection, therefore, must be the scholastic accomplishment already achieved in the applicant's academic years. This achievement is by no means easy to evaluate, for we encounter an absence of uniformity in requirements and in studies pursued, in methods of instruction, in systems of grading and in mental disciplinary values which makes a just comparison of students from different colleges, or even within the same college exceedingly difficult.

A college degree has long been held in reverence and that superior virtue is inherent in its mere acquisition has been unquestioned, but there is good reason to doubt the validity of this ancient faith. The discussion of the arts degree versus the science degree has lost much of its significance since the general abandonment of

*Read in Section on Medical Education, Southern Medical Association, Thirtieth Annual Meeting, Baltimore, Maryland, November 17-20, 1936.

the classic tradition, and in many colleges the difference between these degrees is very slight, so much so, indeed, as to be insignificant. It is obviously not the degree which counts, but what the degree denotes, and this is a variable of wide range; it is not the form but the substance which is important.

The emphasis which has been laid upon the basic sciences as fundamental requisites to the study of medicine seems to have led to the impression that other subjects are of little, if indeed of any, importance save for padding, for the acquisition of units: those impossible numerical measures of unmeasurable scholastic values. We used to hear, and still sometimes hear, discussions of the relative value of culture and science courses. Such discussions are futile and the implication of their opposition without reasonable basis; for the pursuit of science is, or should be, highly cultural. There is a difference, it is true, but it does not appertain to fundamentally opposing value, but rather to different avenues of approach in the search for truth. Chemistry, physics and biology exemplify the observational and experimental methods of acquiring and of verifying knowledge; while history, sociology, languages, for example, illustrate other methods of obtaining information and of arriving at truth. Both methods are equally important to a well rounded mental development; both are cultural. Mathematics and literature, however, may be contrasted as pure science and pure culture; and both are essential to a well ordered system of education. I do not wish to be understood as meaning that even mathematics may be wholly non-cultural, on the contrary mathematics may be definitely cultural; and certain modern concepts of mathematics could only have been reached by the use of productive imagination. A curriculum overweighted with the sciences tends to produce, I believe, an unbalanced type of culture and discipline which does not afford the best mental training for the study and practice of medicine.

Modern educational psychology tells us that education cannot increase intellectual ability, and that mental disciplinary value does not inhere in the content of the curriculum. The first of these opinions is obviously true, but there may be some grounds for questioning the latter. It is my own conviction that a wide culture possesses a very great value in producing breadth of vision and refinement of intellect not otherwise attainable and may have considerable value as mental discipline. I am very sympathetic with the spirit of the sentiment ascribed by McMichael to Radcliffe that as he grew older he was more and more convinced of "the value of the education of the scholar and the gentleman, to the thorough-bred physician," and he continues, quoting Celsus, *Quamvis medicum non faciat, tamen aptiorem in medicinae reddit.* What constituted the education of a scholar and a gentleman may not have been the same in the early part of the eighteenth century as what it is conceived to be in the twentieth century, but the intent of the remark is equally applicable. Disciplinary value does depend to some extent upon the subject studied, but it depends equally or more upon the manner in which the subject is presented and pursued, and this in turn depends upon the skill and ability of the teacher. It is quite true that no teacher, be he ever so skillful, can create intellect, but he may improve and refine the material that already exists; he can aid in the cultivation of taste, train the logical and imaginative faculties to better use, and develop mental independence and self-reliance.

Sitting at our desks and scanning the record of the applicant enables us perhaps to form some impression of the range of his knowledge and his mental outlook, but there is nothing except his collegiate grades to indicate what we are most desirous of knowing, namely, his intellectual capacity, and college grades lack uniform reliability. Too often the student emerges from college with an excellent factual accumulation, but without the capacity to use it productively. He is like the barren fig tree which bore no fruit, nothing but leaves. The difficulty of evaluating adequately the applicant's qualifications by scrutiny of his grades alone is also demonstrated by the frequent high mortality in medical schools.

The evident inadequacy of this method alone led to experiments with other means of testing in the effort to discover if possible a better basis of selection. The aptitude test which the Association of American Medical Colleges has been working out in the last few years is one of these. You are all familiar with the work of Dr. Moss, whose annual reports to the Association point very strongly to the conclusion that the test which the Committee devised is a decided advance over other evaluating methods and gives us a more reliable basis for our selections than we have hitherto had. But are the scores recorded of equal value in all sections of the country? There is considerable variation in facili-

ties, in methods and in ideals of instruction, which may possibly modify our evaluation. Are the scores made by students in Harvard, or Yale, or Princeton, and those made by students in small, less favored colleges with limited faculties and without means of providing equal library and other facilities comparable as measures of intelligence? May not the scores have relative rather than positive values by reason of different types of instruction and different scholastic environments? May not scores of 40 or 60 in one college, for example, be the equivalent of much higher scores in another more favored college as indicators of intelligence? At present it is difficult to answer these questions, but I have gained the impression that such an interpretation may be sound.

The aptitude scores reported from South Carolina have been conspicuously lower than those from certain other sections of the country. This may be partly explained on the grounds suggested above; and partly, perhaps largely, by a pronounced indifference which has been manifested toward the test, due in some measure to the attitude of the faculty member under whose supervision it is given who not infrequently has created the impression that it is a routine procedure of little significance and with little if any bearing upon selections. In some cases the relative position of the basic sciences in the curriculum has apparently affected the score unfavorably. These faults I am endeavoring to correct and am receiving sympathetic cooperation from college presidents.

I have recently analyzed the accomplishment of the students in our school for the last four years in order to ascertain if, under the conditions prevailing in South Carolina, as great dependence could be placed upon the aptitude test as is indicated by Dr. Moss' reports for the country as a whole. This is important because all of our first year students are from South Carolina and mostly from South Carolina colleges; a few from other states are received in the upper classes, but not enough to affect the conclusions which might be reached. In order to facilitate a comparison of scholastic grades a device is used termed the mark index which is obtained arbitrarily from the number of A, B, C, and D grades presented by the applicant, which affords a quickly applicable standard of comparison. The maximum obtainable is 40. The students were divided into three groups: those whose mark index fell below 20, those between 20 and 30, and those above 30. A similar threefold division was made for study of the percentile scores of the aptitude test, those below 20, those between 20 and 50, and those above 50.

It was found that there were no failures among students whose mark index was above 30 or among those whose percentile scores were above 50. The intermediate scholastic grade group contained 8 per cent and the low 28 per cent of failures. The intermediate percentile score group contained 11 per cent and the low 24 per cent of failures. A comparison of conditioned students in the two groups showed the same fairly close parallelism. It was interesting to note that with mark index and percentile score both low the chances of serious difficulty being encountered were very great; if either alone was high the outcome was not so clearly predictable, but the chances of failure were definitely lessened. A study of the degree students showed that neither the B.A. nor the B.S. degree was an "open sesame;" the class position was still determined by the mark index or the aptitude score. Among 81 students holding degrees there were 7 failures, all of which occurred in the low or low middle mark index group; 4 occurred in the low, or low middle percentile score group, and 3 had not taken the aptitude test.

From this study of accomplishment based upon scholastic grades compared with accomplishment based upon aptitude scores, it would seem upon the surface that as far as South Carolina is concerned the two means of selection are of about equal value. It must be borne in mind, however, that few if any premedical students took the test seriously and all seemed wholly indifferent to the outcome; yet in spite of this the results closely paralleled those obtained from scholastic grades and proved of equal significance. This would appear to indicate that in all probability when taken with sincere effort it would possess superior value as an index of the accomplishment to be expected in the medical school.

Occasionally exceptions occur. There are students, well endowed intellectually, who do not manifest ambition and application until they enter the medical school, when, in spite of low academic grades or percentile scores, they are found ultimately in the higher ranks. Conversely, students who enter the medical school with the promise of excellent achievement sometimes fail to fulfill the expectation created by their premedical accomplishment. Both of these groups present more or less serious problems which cannot be solved by rule of thumb; each case requires individual study. These excep-

tional cases, however, do not modify our conclusion that the aptitude test score, especially when combined with the scholastic grade, as we attempt to do, enables us to form a safer judgment of the applicant's ability; and although we may admit that the method is by no means perfect, it forms the best basis for our selections.

To what extent the refinement of intellect, which is culture, may modify the medical scholastic accomplishment it is impossible, with our present information, to estimate, but I may conclude with the expression of my own belief, which is in agreement with the Roman writer already quoted, that, although culture may not make the physician, it nevertheless renders him more fitted for the practice of the art.

DISCUSSION (*Abstract*)

Dr. J. M. H. Rowland, Baltimore, Md.—I have been much interested in Dr. Wilson's discussion. His uncertainty about methods of selection of students must be echoed by all of us. I have been helping to select students for twenty years, but I find myself entirely unable to select any definite yardstick by which to measure prospective students.

We all know that the man who has the best scholastic record in high school and college and who has a high rating in his aptitude test will usually go through his course without failure, especially in the pre-clinical branches, where the greatest percentage of failures occur. He is not quite so certain to excel in the purely clinical years, being frequently surpassed in aptitude in the application of knowledge gained in the pre-clinical years by men not so apt from a scholastic standpoint.

I have not had much faith in personal interview since I gave it quite a prolonged trial. It is hard to measure the qualities which reveal that greatest essential to success in medicine, character. Dr. Wilson spoke of the necessity for culture. I think we must all agree with him. A man may have accumulated a large amount of scientific knowledge and skill in its application to the problem of health, but without some degree of what we are apt to speak of as "culture," he will have a much narrower outlook upon life, will be less able to relate his knowledge to the needs of his patients, particularly his mental cases, and will be a poorer doctor, and a less worth while friend and citizen.

Dr. W. S. Leathers, Nashville, Tenn.—Dr. Wilson presents in his paper the essential points with reference to the admission of students to schools of medicine. However, I wish to emphasize the need for establishing a mechanism which would afford opportunity to use group judgment in the selection of students. All of the elements should be carefully considered, such as personal qualities, character, adaptability to the study of medicine, initiative, originality, scholarship and the general record which the student has made in the institution from which he applies. I have always, and do now, think that the most essential factor in the consideration of a student who applies to a medical school is his scholastic standing. The record which a student has made in his college work is of the greatest importance in giving a sense of security with reference to the whole picture. I therefore wish to emphasize this element in the consideration of students so that the quality of student may be maintained on a higher level than has been generally recognized in the past. A good deal of consideration has been given to the number of medical students that are being graduated in relation to the number of physicians on the basis of the total population and if students who apply to medical schools are required to comply more rigidly with the requirements which are recognized as being essential, the quality of student will be improved and it is probable that the number of those who graduate from medical schools will be decreased.

These points are clearly described by Dr. Wilson. I mention these points to emphasize my own experience in dealing with this problem.

There is a phase of this question which I wish to present especially, and that is, in my judgment better results will be obtained in the selection of students by submitting all applications for consideration to a faculty committee consisting of from three to five persons. The individual opinions of such a committee would serve as a check with reference to undesirable students and it will be less likely that errors will be made in the admission of students who are undesirable. At Vanderbilt such a committee has been serving in this manner for the past eleven years, and it has undertaken its work in a serious and careful way. The committee is composed of representatives from the fundamental science and clinical groups. It meets every week, beginning about February 1, until the quota of students (fifty in number) is selected out of about six hundred applications. Usually those who apply are accepted on the basis of a unanimous vote of the committee. The usual procedure is followed concerning information relative to the student, such as filling out application, sending photograph, and securing two references, preferably from teachers under whom the student has worked. A form is also sent to two members of the faculty in the institution from which the student applies and certain items are checked concerning his qualifications. This has proven helpful. The aptitude test is also one of the important factors used in the admission of students. Even though the greatest care is used a few students will be admitted who will not prove successful in the study of medicine. In some instances these have presented very satisfactory scholastic records. It is true, however, that if a great deal of care is used in the selection of students the percentage of failures should be reduced to a minimum. This is desirable from the standpoint of both the medical school and the applicant.

Dr. Wilson (closing).—I am inclined to agree with Dr. Rowland that the personal interview is not of very great value, but I do think it is helpful. It is possible in conversation to obtain a clearer insight into an applicant's outlook and a more accurate evaluation of his scholastic work than can be obtained by his grades alone. When a college graduate, for example, told me that he had studied Latin for two years, but did not recall what he had read, he thought it might have been the Iliad, I am quite sure that I had a better understanding of the significance of his written record. One value of the aptitude test is the light it sheds on the use the applicant has made of his scholastic opportunities. Limited knowledge of scientific vocabulary, poor reasoning power, restricted general information, slowness of apprehension, in spite of fairly good grade marks,

would not suggest encouraging material for a successful career in the medical school. It is true, however, as Dr. Leathers points out, that sometimes scholastic grades and the aptitude test fail to prove accurate guides to selective judgment, but notwithstanding they are on the whole the only guides we can safely follow.

HANDICAPS IN THE TEACHING OF HISTOLOGY*

By E. V. Cowdry, Ph.D.
St. Louis, Missouri

Histology is one of the fundamental medical sciences. Its importance in the medical curriculum does not require emphasis to this audience. As histologists we can hold our heads high. In our company are listed many of the immortals: Malpighi and Theodor Schwann, Camillo Golgi and Ramon y Cajal, to mention only a few.

Why, then, is it that histology is probably the worst taught of all preclinical subjects? I think that some of the reasons are to be found by a study of the internal organization of anatomical departments and of their external relations with other departments.

Let us begin by contrasting the group of anatomical sciences with the group of physiological sciences; for on the two equally medical education rests. The old idea that the anatomical sciences are wholly morphological, and therefore on a lower plane, is no longer tenable. We can listen to as excellent papers dealing with function at meetings of the American Association of Anatomists as at any other gatherings.

The anatomical sciences comprise anatomy proper (gross) and its extensions: histology, neurology and embryology. To the list should be added anthropology, hematology and cytology, but these are not offered as separate subjects to medical students. Similarly, the physiological sciences are made up of physiology proper and its extensions: physiological chemistry and pharmacology.

The Council on Medical Education and Hospitals of the American Medical Association states that, in an acceptable medical curriculum, instruction in anatomy (including histology) must be 14 to 18.5 per cent of the total; whereas instruction in the physiological sciences (listed separately as physiology, biochemistry and pharmacology) must together amount to only 12 to 16 per cent.

The degree of specialization in the anatomical sciences is, from the point of view of accomplishment, at least equal to that in the physiological ones. From the one it finds outlet in journals of anatomy, microscopic anatomy, neurology, anthropology, and from the other in journals of physiology, physiological chemistry, pharmacology and experimental therapeutics. These are backed by lusty and vigorous societies or associations. Moreover, in the actual instruction of medical students, it would probably be no more difficult for a physiological chemist to teach physiology and pharmacology than for a neurologist to give instruction in gross anatomy, histology and embryology.

Yet, as organized in our medical schools, the anatomical sciences are usually included in one large, loose jointed department; while the physiological ones are spread in three compact units each with a spokesman thoroughly familiar with the subject.

Consequently, representation of the anatomical sciences in faculty meetings is often one-sided and inadequate. I have examined the printed announcements of 69 recognized medical schools in the United States to ascertain the subjects taught by heads of departments of anatomy concerning which they can therefore speak with authority based on personal experience.

In 19 it is impossible to say which of the anatomical sciences they particularly represent; for in 4 they teach gross and histology (often with embryology), in 5 a combination of all subjects is offered, and in 10 the allocation of teaching to individuals is not specified.

In 10 schools, in place of a single department of anatomy, there are two: anatomy and microanatomy (or histology and embryology). In some places neurology is given with gross, but it is more commonly presented with histology.

But in 31 schools, among which are numbered some of the most important, the director of the laboratory takes gross and leaves histology, generally with embryology, to others. In only 9 does he choose histology. This means that in these schools gross is given preference in the ratio of more than 3 to 1.

There are many good reasons why this should be the case. Some heads of departments are primarily interested in surgery and fully realize the practical value of work in the dissecting room. Their number is decreasing. Others are at heart comparative anatomists and delight in

*Read by title in Section on Medical Education, Southern Medical Association, Thirtieth Annual Meeting, Baltimore, Maryland, November 17-20, 1936.

*From the Anatomical Laboratory, Washington University School of Medicine.

tracing the course of evolution culminating in man. As these drop out, anatomy becomes poorer. Anthropologists are on the increase. Theirs is a fashionable and valuable lore. But many take charge of the work in gross anatomy from a sense of duty. Before I left for China, to become head of a department of anatomy there, Dr. Mall told me that I must figure as a gross anatomist and have another member of the department manage the instruction in histology. This I did. I think that he gave similar advice to others, who labored in his laboratory as a kind of proving ground. Be it noted, however, that Dr. Mall, himself, chose to teach histology, at least during the time that I was at Hopkins, and to leave gross anatomy in other capable hands; further, that at the other principal center, the University of Chicago, Dr. Bensley elected to teach histology and to assign gross anatomy to others.

It often happens that the head of a department, who teaches gross anatomy, is in his research a skilled histologist and perfectly capable of representing all the anatomical sciences. It must be admitted, however, that some gross anatomists have a very limited knowledge of histology and would be lost in expounding the complexities of fiber tracts of the brain, or the intricacies of embryological development.

The net result is that the needs of histology, taken by and large, are not so directly and in such a single minded way presented to the powers that be as are those of either of the three physiological sciences. Moreover, the large and unwieldy group of anatomical sciences must in most cases rely upon one advocate in contrast with the three mutually supporting advocates of the physiological sciences.

The handicap suffered by histology, with which I am now primarily concerned, is real, not imaginary. I believe that it is expressed by the lack of sufficient training preliminary to histology demanded of entering medical students, by inadequate facilities for teaching histology and by the character of questions on histology asked by the National Board of Medical Examiners.

With regard to prerequisites, anatomists and histologists have not been sufficiently vociferous. The latter, seldom occupying administrative posts and rarely seen at faculty meetings, have permitted themselves to be branded as simple-minded morphologists whose needs are almost negligible: a microscope, a few chemicals, as much alcohol as they want, a good sharp knife and plenty of time for brooding.

Our friends in the physiological sciences have ridden on the crest of the wave of conviction that medicine will be rejuvenated by contact with physics and chemistry. They have insisted on thorough and standardized training in physics, inorganic and organic chemistry, quantitative and qualitative analysis. And we are of one mind with them that all this is desirable.

But year after year students are admitted to our courses whose preliminary training in biology is highly variable and often deficient. They have been told all about the earthworm and the starfish and but little about man, his structure, development, evolution and inheritance.

We require as a prerequisite for histology an elementary course in the subject of approximately 75 hours. In it the students should learn to use a microscope just as the biochemists demand that they must be able to use a balance and other pieces of apparatus. They should also learn to recognize the histological quality of the principal organs and tissues of the human body, again in the same way that biochemists demand experience in qualitative analysis.

Before we decide whether embryology should also be listed as a prerequisite it is well to review the practice in schools of medicine throughout the country. In 3 schools training in embryology is required for entrance, in 1 it is recommended, and in 1 no provision at all seems to be made for it. In 4 embryology is offered as part of a combination course, in 25 it is given with histology, while in 35 it is dignified as a separate and important part of the medical curriculum. The longest course in embryology is 132 hours in two institutions, and the shortest 21 hours. The average is about 90 hours.

The pressure on the students in their first two years is already very great. Some knowledge of embryology is needed for proper instruction in the anatomical sciences from the day they enter. It is my opinion that an elementary course in embryology of 75 hours should be made a prerequisite and that its content should be standardized to the same extent as courses in chemistry and physics. This would result in easing the situation where embryology is taught in medical schools and in making the additional time necessary for its presentation in other schools shorter.

The best way to arrange science prerequisites, not only for histology but for the entire course in medicine, is for the medical faculty to control instruction in them. As I have stated elsewhere, I think that the prerequisites should be incorporated in the medical curriculum by

beginning two years earlier and by making the course one of six years. Failing this, the medical faculties should supervise premedical training in the universities.

If this change is brought about, care must be taken not to sacrifice the cultural background which medical students are expected to acquire in the universities. Preliminary training of the right sort in almost any subject can give breadth of view, judgment, mental poise and ability to concentrate. Real mastery of the English language is far more important for most medical students than a knowledge of French and German which is so small that it is not usable.

Our histological laboratories are constructed and equipped for instruction of the sort that was offered a generation ago. The facilities are not modern and up-to-date. Each student is given a stool to sit on, a place to use a microscope and suitable illumination. But they are closely crowded together in orderly rows. In general, some twenty students are expected to get along with running water at a single sink.

When efforts are made to introduce the study of living tissues; to have the students do something instead of simply sit and see; they get in each others' light, crowd about the sink and confusion results. The director of the laboratory, often in his research a distinguished experimentalist, is sympathetic but what can be done?

In some cases the overcrowding of students can be relieved by securing additional space and by distributing the students more widely so that they shall have at least elbow room.

When we study the questions in anatomy by the National Board of Medical Examiners, we discover that histology has been somewhat neglected.

From 1930 to September, 1936, inclusive, 6 to 8 questions have been asked, including usually 1 and rarely 2 in histology. But the students have never been required to answer more than 5 questions. As a result, it frequently happens that by selecting those on gross anatomy, together with one often asked in embryology, they can get through, perhaps with full marks, without showing any evidence whatsoever of knowledge of histology.

One way to interpret this condition is to suppose that the Board has such confidence in the excellence of the instruction in histology given in our universities that to test the students is superfluous.

Unfortunately for our *amour propre* we find that the questions which are asked are either easy or so broad in scope as to indicate that a full answer is not expected.

EXAMPLES

(1) February, 1936. Question No. 4. Draw a picture of a histological section of the lung, indicating and naming all structures.

(2) June, 1935. Question No. 2. Draw a median sagittal section through the pituitary gland, illustrating carefully all the different type cells and their general arrangement.

(3) May, 1935. Question No. 4. Draw a typical histologic section of the pituitary gland, showing and naming the several types of cells with their usual arrangement.

(4) February, 1935. Question No. 6. Draw a section through the mature ovary, showing its general histologic structure, and label all of the characteristic cell types.

(5) February, 1933. Question No. 1. Describe in detail the histology of the pituitary gland.

These and other questions reflect the old histology of pure devitalized morphology. By contrast the questions in histology of the National Board of Dental Examiners cannot be evaded and are not elementary.

In summary it may be said that we have two tasks before us. The first is to work more effectively under the conditions now obtaining and in the space available. We must devote time and energy, which could be used for personal advancement through research, to instruction. A spirited, enthusiastic and sympathetic teacher will accomplish far more than one who gives his time grudgingly. The students will advance through their own initative, not by spoon feeding, however well intentioned it may be.

They must be given something to do with their hands, so that they will be relieved from the deadly monotony of sitting quietly on hard seats alternately peering through a microscope and reading what somebody has said about tissues. When dealing with the blood, which is the best introduction to histology, this is easily accomplished. The repeated drawing of their own blood will at least keep them awake and there are many simple and quick technics which they can employ themselves.

To learn by doing in the case of the several organs is more difficult to arrange. Much is to be gained by a sustained effort to bridge the gap between gross and microscopic anatomy. It may not be always feasible to synchronize histology with dissection, but special dissections should be repeatedly displayed in the histological laboratory. Each student should be so equipped that he can dissect and tease apart fresh organs

and tissues under low magnification before he proceeds to examine them in detail. Simple experiments should be performed, and more complicated ones by the instructors with student aid. A loan collection of permanent preparations is essential. It should be retained by the students as long as they remain in the school and be used especially in pathology. Drawings and written reports should be made occasionally, but not so frequently that it is impossible to insist on excellence.

The second duty is bear in mind the general handicaps of non-recognition of histological needs and indirect representation on faculty councils which obtain in a considerable number of medical schools, but of course not in all.

To concentrate the physiological sciences by fusion of small departments would be regarded as a step backward and is altogether impossible. But the now fashionable combination courses could perhaps be more easily arranged by cooperation of the several departments which comprise the physiological sciences than within departments of anatomy; because, in many cases, they could rest on previous work in anatomy. The difficulty with combination courses in the anatomical sciences is that dissection must proceed in a definite sequence and that histologists are not much concerned with the extremities the dissection of which consumes a good deal of time.

To divide the anatomical sciences into two independent departments has been done in some medical schools, but it is of questionable value. I recall how Dr. Mall always insisted that, to be effective and to be run economically, the units in a medical school must be fairly large. He would have said, I am sure, that the strategic thing to do is not to separate the anatomical sciences, but to knit them more firmly together.

Representation by more than one individual is desirable and necessary in some cases. We may expect a tendency for neurology to emerge as an independent department as pharmacology has done comparatively recently in the other group. But it would be a mistake to demand equality with the physiological sciences. If we did, medicine and surgery might well say: we, too, have our specialties only some of which are represented now. And the number of heads of departments would grow. The group thus formed would become unwieldy and less efficient. Autocratic authority would have to be more than ever vested in a dean or in a small executive committee. The voices of the physiological sciences, and of all the others, would be weakened.

Histology must be led from seclusion into the light of progress as an important member of the anatomical sciences. Its spokesman may continue to engage in the teaching of gross anatomy; but he will do his best to see that the students come adequately prepared, that the facilities afforded in histological laboratories are improved to the end that instruction may be given in a dynamic way with plenty of action in place of the old dull routine of tiresome microscopic study of sections of pickled tissues.

THE COMPREHENSIVE EXAMINATIONS AT THE UNIVERSITY OF TENNESSEE*

By HARRY C. SCHMEISSER, M.D.†
Memphis, Tennessee

Comprehensive examinations in preclinical subjects termed by Dean O. W. Hyman a "far-reaching step in medical study" were instituted at the University of Tennessee September, 1934. To Dr. A. H. Wittenborg, Professor of Anatomy, for many years Chairman of the Committee on Examinations, and a critical student of European and American methods of examining medical students, is due the credit of formulating and conducting these examinations. They are unusual in that the questions are asked orally and the answers judged by members of the clinical faculty instead of the preclinical teachers. The comprehensive examination is designed to result in a quickening of the medical student's responsibility for his own education and the affording of an opportunity to achieve better integration of the entire medical course. Passing grades must be made in the preclinical part of the medical course before students can begin the study of the clinical part. The examinations are expected to refute the charge that "medical students learn too much and know too little."

These examinations are now being conducted without penalty for the purpose of organization. That class which entered the College of Medicine after notice of the innovation appeared in the Bulletin will be subject to penalty. This affects the class taking examinations during next January. The student completes his preclinical subjects at the end of the sixth quarter. He is required to take three months' vacation for rest and

*Chairman's Address, Section on Medical Education, Southern Medical Association, Thirtieth Annual Meeting, Baltimore, Maryland, November 17-20, 1936.

†Professor of Pathology and Bacteriology, University of Tennessee College of Medicine.

review before taking the examinations. During this time, transferred students from other schools are given the opportunity of taking as special students those courses in which they are deficient. The examination is held on the first three nights of each quarter.

The following notice is posted on the Bulletin by the Chairman of the Committee on Examinations for the information of the students:

PRECLINICAL EXAMINATIONS
September 28, 29, 30, 1936
STUDENT SECTIONS

A (8-10 Names)	B (8-10 Names)	C (8-10 Names)

SCHEDULE OF EXAMINATIONS

	September 28	September 29	September 30
Anatomy Histology Embryology	A	B	C
Biochemistry Physiology Pharmacology	B	C	A
Pathology Bacteriology	C	A	B

Report at 7:25 p. m.
For Anatomy, etc., in Anatomy Laboratory.
For Biochemistry, etc., in Chemistry Lecture Room.
For Pathology, etc., in Histology Lecture Room.

The Chairman of the Committee on Examinations sends the following letter to the Chairman of a Committee of Examiners consisting of five members of the clinical faculty:

"Comprehensive examination in anatomy, histology, and embryology will be held September 28, 29, 30 at 7:45 p. m. on the anatomy floor of the Anatomy Building.

"Your committee and room assignment follows: Dr. ....., Chairman, room 401; Dr. ....., room 402; Dr. ....., room 403; Dr. ....., room 404; Dr. ....., room 405.

"You will notify the members of your committee and request them to be prepared to file a copy of the questions asked with the Division of Anatomy. A roster of the section to be examined will be placed upon each examiner's desk each day.

"Each chairman will hold a preliminary meeting, at which time all questions will be criticized by the committee as a whole. Examiners are requested to prepare their own questions and to limit them to the preclinical subjects as they pertain to their specialty. Questions must be asked in terms familiar to the preclinical student. Each examiner will report a grade of 'E' (excellent), 'G' (good), 'S' (satisfactory), 'P' (passed), or 'X' (failed) for each question.

"At the end of the third day's examination there will be a meeting of the three chairmen in Dean Hyman's office. Each chairman must bring a complete set of grades given by his five examiners."

Similar letters are sent to the Chairman of the Committee of Examiners in (a) biochemistry, physiology and pharmacology; (b) pathology and bacteriology.

The Committee on Examination requests the chief of the preclinical division whose departmental subjects are being examined to appoint one faculty member for each day to act as usher at the examination. The usher of the last day collects the questions used and turns them into the chief of division to be filed. The rest of the preclinical faculty is urged to attend as frequently as possible in the capacity of observers.

Examination in anatomy, histology and embryology is held on the fourth; pathology and bacteriology on the third; and biochemistry, physiology and pharmacology on the second floors, respectively, of the Anatomy Building. Each examination is conducted in a similar manner.

The examination in pathology and bacteriology will be given in detail. The name of the examiner appears on the door of the room in which he is examining. The pathologist or bacteriologist who is acting as usher on the first evening has received from the Committee on Examinations the rosters of the student sections to be used by the examiners and ushers of all three nights. He distributes those to be used on the first night, retaining one for himself, and passes those for second and third nights on to the usher of the second night, who in turn passes those for the third night on to the usher of the third night.

The usher calls five students from the assembly room and assigns one to each of the five examining rooms. The examiner may question the student as long as he wishes, but the average time taken is ten to fifteen minutes. The examination is entirely oral. Different questions are asked by the examiners on each night. All questions are turned into the usher on the third night, who in turn files them with the Chief of the Division of Pathology and Bacteriology.

Students are transferred from room to room until each has visited every room. This first group of five are sent home without ever again reentering the assembly room. A second five students are called from the assembly room and examined and dismissed. It required about two and a half hours to examine a section of 8 to 10 students.

The Dean selects the examiners. Each Committee of Examiners is composed of a member from general medicine, general surgery, obstetrics or gynecology, and two from the specialties. He serves once in twelve months and receives

a small honorarium. Some men who are known to be poor examiners are not asked to serve.

Following the last day of examinations the Chairmen of the three Committees of Examiners meet with the Dean, who now acts as Chairman of this Committee on Promotion. The student must pass each group of subjects before being permitted to proceed into the clinical quarters. Failure in one or more groups entitles him to a second examination after at least one quarter. It is left to the discretion of the student whether or not and how he reviews. No charge is made for attendance at lecture and other auditory instruction, but if he participates in the laboratory he must pay a fee. The second failure requires him to retire permanently. The committee has full jurisdiction over borderline cases. The comprehensive examination is recorded as "P" (passed) or "X" (failed) and does not influence the rating of the student at graduation. His class standing is computed from the grade received on completion of each course.

DISCUSSION

This may be considered under the headings (a) student, (b) clinical faculty, (c) preclinical faculty, and (d) general.

Student.—The student, although he has passed each preclinical subject at the time of completing it, knows that he must again demonstrate a comprehensive knowledge before he is permitted to enter on the study of the clinical subjects. He, therefore, is stimulated to master it better, and to retain it longer or if necessary to review before taking the examination. If a student is sick at the time of examination he must take it at the next quarter.

Students are acceptable as transfers to other schools at any time before taking the comprehensive examination because they have passed and been graded on completion of each course. On passing the comprehensive examination the first or second time they are prepared to enter the third year of other schools. On failing the comprehensive examination the first and second time they are still eligible to enter the third year in other schools on the basis of the grade received for each course, but it would be unlikely that a school would accept them.

Non-medical students taking medical subjects and having received a grade on completion of each course, may, if they later wish to become medical students and are able to fulfill the premedical requirements, receive credit for completed courses on reconsideration of the grade received.

Graduate students taking medical subjects are required to make a grade of "G" or better in all courses. Therefore, if they should later wish to become medical students and are able to fulfill the premedical requirements, they will receive credit for completed courses.

The former non-medical and graduate student is required to take the comprehensive examination.

Clinical Faculty. — The clinical faculty, by holding the examination, is required to keep abreast of the modern pathology, and so on, at least in his own specialty; and he has the opportunity of preventing a student from advancing into the clinical courses if the clinician does not think he is prepared. By restricting the examining clinician to the preclinical matter of his specialty one can expect a more exacting examination. The examination becomes sufficiently comprehensive after five different clinical subjects have been covered.

Preclinical Faculty.—The preclinical faculty, by attending the examination given by each examiner of the clinical faculty, can judge the fairness of the questions asked and ascertain whether or not his subject was adequately covered when originally taught, and in such a way as properly to prepare the student for the clinical part of his course.

General Discussion. — Rappleye,[1] in 1931, writing on the methods of examining students in Europe, states that the Germans hold an examination known as the "physicum" at the end of the first five semesters of medical study. The examination is given in small groups usually and lasts four days. It covers anatomy, physiology and the premedical sciences. The examination is both theoretical and practical. A second examination covers the clinical subjects and pathology, and is known as the "staatsexamen," which the student may take at the end of eleven semesters of medical studies. The examination in pathology lasts two days. In it the student must demonstrate his ability to do a postmortem examination and to write a protocal. The small number of required practical courses during the medical course leads to a great variety of coaching and tutoring courses.

The examinations in Denmark are very similar. There are two features which are of interest. The first is the use of two external examiners appointed by the State, known as censors. They listen to the questions given by the examiners and the answers by the students, but do not participate in the actual questioning. They

keep grades for each student, however, and their marks are a part of the determination of whether the student passes. The second feature is the attendance at the oral part of the examination of the other students, who listen to the questions and answers and become acquainted with the procedure which they will go through later.

A special feature of examinations in Great Britian is also the use of the external examiners. The examination in each subject in the medical course is conducted jointly by a resident examiner, who is usually a professor in the department, and an external examiner, who is usually a professor in the same subject in another school. The external examiner checks the students independently in the written, the oral and the practical tests. These examiners are usually appointed for two or three years and may serve several institutions at the same time. The plan is designed to protect the student as well as the university and has also the desirable result of keeping teachers in different universities familiar with the work being done in other institutions, and in stimulating a high level of uniformity in methods of teaching and examinations.

Harding,[2] in 1932, compares the British and American methods of medical examinations.

"The British system of comprehensive examinations at the close of the training period, as contrasted with the frequent examinations in each study as is done in America, has received favorable criticism."

He writes of personal experience at the Royal College of Physicians and Surgeons of Edinburgh. An examination is given at the close of approximately two years of professional study and includes the basic medical sciences. The final examination is given at the close of the minimum medical training for licensure by these corporations. It is a comprehensive examination and a large amount of emphasis is placed on the facts of the basic sciences as they apply to the clinical subjects. Both examinations are written, practical and oral. The student is examined by two examiners, each of whom grades the student on the questions asked by the other. Each one is allotted fifteen minutes to ask questions. These examinations are given every three months, which fact has developed an adequate group of expert examiners.

The British system of examination allows greater flexibility in the conduct of courses, it presents an ideal situation for the development of "master teachers," and it places the responsibility for securing an adequate education on the student. The cramming problem unfortunately is not eliminated in the student's work.

Lyon,[3] in 1933, writes about the comprehensive examinations at the University of Minnesota. The examinations are confined to departmental subject matter, set and read by departmental examiners and recorded as covering departmental requirements. They have four examinations covering respectively the required work of the freshman, sophomore, junior and senior years. These examinations, except for seniors, are offered twice yearly, in June and in September. Seniors are examined at the end of any quarter in which they complete the curriculum. The examination is entirely written. The registrar's record is merely "failed comprehensive," with the date. The "all or nothing" rule does have the advantage of practically eliminating the conditioned student from classes. There is at present no limit to the number of times a student can try to pass an examination.

Schwitalla,[4] in 1933, reports on the comprehensive examination at St. Louis University School of Medicine. A sophomore and senior examination is given. Both are oral. The student is not only examined in the preclinical sciences at the end of his second year, but again at the end of his senior year.

Blake,[5] in 1933, writes on the comprehensive examination in theory and practice. He states that the comprehensive examination was instituted at the Yale School of Medicine in 1927 for students who were ready to begin work in clinical medicine and public health, in 1928 for students who had completed their work in clinical medicine and public health and were ready for graduation. These examinations substitute for the previously used multiple examinations in course.

Theory.—"The examination for entrance into the course in clinical medicine and public health should be given in these subjects, not by the faculties in the basic biological sciences. Similarly, the comprehensive examination at the end of the medical school course should be given not by the faculty of the school from which the student is about to graduate, but by an impartial outside examining board."

Technic.—Two comprehensive examinations have been used, the first for students who have completed the required work in the basic biological sciences and are ready for admission into the courses in clinical medicine and public health, the second for students who have completed their clinical studies and are ready to qualify for the M.D. degree and consequently to begin the practice of medicine or other work in related fields.

The first examination, since the school is on the trimester system, has been offered three times a year, in December, March and June, the responsibility for decision as to whether he is prepared to take the examination having been placed on the student. The second examination, since the University at present awards degrees only in June, has been offered only once a year. The responsibility both for preparing and giving the examination and also for evaluating the qualifications of the candidates has been placed in the hands of the faculties of clinical medicine and public health as represented through an examining committee of these faculties. Examinations are written, practical and oral. Students having done well in the first and second, may be excused from the third. Students are eliminated after the second failure. Until June, 1932, the final comprehensive examination in clinical medicine and public health had not been given by an impartial outside examining board, for the simple reason that no such examining board had been available. During the academic year, 1932-33, Part I of the National Board examination was to be substituted for the written part of the comprehensive qualifying examination and Part II for the written part of the final examination.

SUMMARY

Practically all European colleges have for years based admission to the study of clinical courses in medicine on a successful examination in the preclinical subjects. However, the European examinations have been given by the preclinical faculty. Adverse criticism of this system has been based upon the fact that students frequently do not study the preclinical subjects systematically, but depend upon tutorial instruction, which at its worst is no better than "spotting" the questions and "cramming" for examinations. In the United States, until quite recently, promotion from course to course has been based upon examinations in each preclinical subject. While this has necessitated careful study of each of the preclinical subjects, and indeed each part of each preclinical subject, it has nevertheless tended to put a premium upon the ability to memorize this matter and to develop an attitude toward the preclinical subjects that once having passed the examination on the subject the student is through with it. As a consequence, American medical students have been criticized on the grounds that at no given time have they achieved a comprehensive grasp of the subject matter of the preclinical years, nor indeed of the clinical years, either.

CONCLUSION

The comprehensive examination, as organized at the University of Tennessee, attempts to combine the good points of both the European and American systems while avoiding the weaknesses of each. The fact that the examination is given by clinical teachers is intended to restrict the questions to the subject matter which will be immediately useful in the work of the clinical years. As a by-product of our examination it is expected that a machinery will be developed which will keep the preclinical men at all times aware of that particular part of the subject matter in their courses which is most heavily stressed in the clinical years and so produce a better integration as between preclinical and clinical instruction. It is also expected that members of the clinical faculty will be stimulated constantly to refresh their familiarity with preclinical subjects.

BIBLIOGRAPHY

1. Rappleye, W. C.: Methods of Examining Students in Europe. Proc. Ann. Cong. Med. Educa., pp. 28-30, 1931.
2. Harding, II, W. G.: A Comparison of the British and the American Methods of Medical Examinations. J. A. Am. Med. Coll., **7**:243-246 (July) 1932.
3. Lyon, E. P.: The Comprehensive Examinations at the University of Minnesota. J. A. Am. Med. Coll., **8**:129-136 (May) 1933.
4. Schwitalla, A. M.: The Comprehensive Examination at St. Louis University School of Medicine. J. A. Am. Med. Coll., **8**:137-147 (May) 1933.
5. Blake, F. G.: The Comprehensive Examination in Theory and Practice. J. A. Am. Med. Coll., **8**:148-158 (May) 1933.

SYMPOSIUM ON MALARIA—Part 2‡

MALARIA PREVENTION ACTIVITIES, 1936*

By L. L. WILLIAMS, JR., M.D.†
Washington, District of Columbia

MALARIA CONTROL ACTIVITIES

During the year the state health departments of 16 states were engaged in the cooperative malaria control drainage program of the Works Progress Administration. The Public Health Service, as a function of the Domestic Quarantine Division, cooperated in this activity by furnishing state health departments with trained personnel for technical supervision of the projects. This program has been going on since the fall of 1933 and has been described before. Therefore, it is thought not necessary here to explain the details. The majority of state health departments have required local communities to assure maintenance of the drainage systems installed. A few of the projects have been accomplished through the establishment of transient camps.

The following table sets forth work accomplished during the present calendar year, from January 1 to October 31:

WPA MALARIA CONTROL DRAINAGE PROGRAM ACCOMPLISHMENTS

State Health Departments and Public Health Service Cooperating

Average number counties	330
Average number laborers	29,272
Drainage, new and recleaned (miles)	3,919
Water surface drained (acres)	76,931
Persons protected	2,075,735

Many state health departments have been engaged in the enforcement of existing state impounded water regulations. However, a recent survey disclosed that there are some states without adequate regulations.

Two state health departments inaugurated new divisions of malaria control and research.

In the prosecution of malaria control a number of state health departments made blood surveys to determine the prevalence and distribution of malaria. These often included surveys of school children. Specimens were examined in state and local health department laboratories or in the thick film laboratory of the Public Health Service. Most state health departments made surveys of the prevalence, distribution and location of breeding areas of Anopheles. Several states made efforts to improve the reporting of malaria mortality and morbidity by furnishing laboratory facilities to practicing physicians and encouraging greater precision in diagnosis, with special reference to the type of malaria. Some states have planned to make epidemiological investigations of malaria cases. Spot maps of malaria cases and anopheline prevalence were advocated, especially in local health departments.

Screening programs were reported by several local health departments. An unsuccessful effort was made by a few states to have screening included in the Works Progress Administration program. The fact that increased private property values would result following screening, largely at Government expense, prevented its inclusion.

Many cities, towns, and local health departments reported carrying on mosquito control by oiling, Paris green dusting, and minor drainage. These programs were directed primarily against Anopheles but included control of all types of mosquitoes.

The Public Health Service cooperated with the Resettlement Administration and with the Soil Conservation Service on malaria control at small recreation lakes and small soil conservation ponds. This cooperation was in the form of the preparation of bulletins for distribution by those agencies in areas in which construction work might result in malaria hazards. More technical information was supplied to the directors and engineers of these agencies and it was strongly recommended that preliminary plans be submitted to the state health department involved, for approval.

There has been a decided trend to a more permanent type of construction of mosquito control drainage systems throughout the states. This has been referred to as *building malaria out*.

RESEARCH ACTIVITIES

In the field of drainage, research has been carried on by several states and by the Public Health Service in methods of sodding and riprapping ditch banks to increase stability. Several types of grasses were tested. Ditch linings to prevent erosion of ditch bottoms; to increase the length of ditch life, and decrease maintenance requirements have been studied. Various materials have been used for the construction of wearing surfaces, including asphalt, riprap, broken stone, concrete and others. Various binders and reinforcings were tested. One state reported a study in lowering the

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*Sub-committee on Malaria Prevention Activities: Dr. L. L. Williams, Jr., Chairman, Washington, D. C.; Dr. Felix J. Underwood, Jackson, Mississippi; Dr. John A. Ferrell, New York, New York; Dr. E. L. Bishop, Knoxville, Tennessee; Dr. T. F. Abercrombie, Atlanta, Georgia; Dr. W. A. McPhaul, Jacksonville, Florida; Dr. Carl V. Reynolds, Raleigh, North Carolina; Dr. J. A. Hayne, Columbia, South Carolina; Dr. W. B. Grayson, Little Rock, Arkansas; Dr. Charles M. Pearce, Oklahoma City, Oklahoma; Dr. John W. Brown, Austin, Texas; Dr. I. C. Riggin, Richmond, Virginia; Dr. A. T. McCormack, Louisville, Kentucky; Dr. J. A. O'Hara, New Orleans, Louisiana; Dr. J. N. Baker, Montgomery, Alabama; Dr. W. C. Williams, Nashville, Tennessee; and Dr. D. P. Curry, Ancon, Canal Zone.

†Senior Surgeon, United States Public Health Service.

‡The Symposium on Malaria, papers and discussions from the National Malaria Committee, meeting conjointly with the Southern Medical Association at Baltimore, Maryland, November 17-20, 1936, which are to be published in the SOUTHERN MEDICAL JOURNAL, will appear in two parts: Part 1 in August and Part 2 in September.

elevation of culverts so that the invert is slightly below the grade of the stream. It is claimed that this method of construction is superior to that of concrete aprons contiguous to the downstream side of the culvert as the latter frequently merely results in the shifting of pot holes formed at the downstream end of the culverts to the downstream end of the aprons.

In the field of biology the Tennessee Valley Authority and the Public Health Service were engaged in studies of possible methods of biological control of Anopheles, including larvae requirements of shade, food supply, protection, etc. The staff of the International Health Board was engaged in studies of characteristics of the parasites, infectibility of species of Anopheles, homologous immunity, and other research studies. Both the International Health Board and the Public Health Service have been engaged in studies of induced malaria used in the malarial therapy of paresis. One state was engaged in a study of the date and localities involved of the spring emergence of Anopheles.

The Public Health Service carried on work of classifying Anopheles and yellow fever vectors of the Caribbean area. The Gorgas Memorial Laboratory and the Public Health Service have continued observations on the effect of drugs on malaria rates in Panama.

The Public Health Service began a study of airplane convection of mosquitoes and protection therefrom. This has been carried on by the Office of Malaria Investigations in cooperation with the Division of Foreign Quarantine.

Recently, the Public Health Service commenced a study on the prevalence, distribution and trends of malaria in the United States. From time to time the state health departments will be visited and their cooperation invited in this study.

An attempt will be made to correlate the prevalence of malaria as determined by actual field surveys with that reported through malaria morbidity and mortality statistics.

EDUCATIONAL ACTIVITIES

It is generally agreed that the Works Progress Administration malaria control drainage program was of tremendous educational value. It focused attention of the workers and communities on malaria and malaria control, making them malaria conscious. This fact is evidenced by the ready agreement on their part to enter into maintenance compacts. They have realized that unless malaria control drainage systems are properly maintained a return to former endemic conditions, and perhaps even epidemic conditions, may be expected. Industrial companies distributed a large number of pamphlets on malaria control through local and county health departments. Motion pictures of phases of malaria transmission and malaria control were prepared and shown in schools, colleges, and to local groups. Generally these were accompanied by lectures. The report of the Sub-committee on Engineering entitled, "Malaria Control for Engineers," was mimeographed and distributed to state health departments, university libraries, and others interested. The Public Health Service republished the reprint, "A Guide to the Identification of the Common Mosquitoes of the Southeastern United States," with color plates of adult mosquitoes.

MALARIA MORTALITY IN THE UNITED STATES, WITH ESPECIAL REFERENCE TO THE SOUTHEASTERN STATES*

By C. C. DAUER, M.D.†
and
ERNEST CARROLL FAUST, PH.D.‡
New Orleans, Louisiana

Each year beginning with 1931 a report on malaria mortality by counties has been presented before the National Malaria Committee. This year's report will review the 1935 mortality data for each of the 14 states in the southeastern United States, and, in addition, will present some information we have been able to collect on the types of malaria found in different sections of this area, as well as a brief report on malaria mortality in certain states outside the southeastern area.

Records of mortality by counties have been received from each state in the southeastern United States. We gratefully acknowledge the cooperation of each state in furnishing the data which form the background of our report.

Among the 14 states in this area, four, Alabama, Missouri, North Carolina and South Carolina, experienced a slight rise in mortality in 1935, as compared with 1934.** The remainder had declines of varying degrees, except Kentucky, where the rate remained stationary. The rates for Alabama and North Carolina increased in 1933, 1934 and 1935. In Kentucky and Missouri they have fluctuated slightly, but rates in these states for the years 1933 to 1935, inclusive, were in excess of the average for 1929 to 1933 (see Chart 1).

In this report we have grouped counties in the same manner as was done in the last report (*Table 1*). The grouping according to the average mortality rates for the years 1929 to 1933, as shown on the map in the 1934 report, is an arbitrary one, but it appears to be satisfactory for purposes of comparison.

In the sections of the states comprising the large endemic area of the lower Mississippi Valley, each group of counties, as indicated in *Table 1*, showed a decrease in mortality in 1935 as compared with 1934. The amount of decrease varied from 2 per cent in northern Louisiana to 61 per cent in eastern Arkansas. In the southern half of Louisiana, there was a marked increase in malaria mortality in 1935. Western Arkansas showed a slight decrease in mortality. In the southeastern counties of Missouri, where malaria is endemic, the mortality rate declined 44 per cent in 1935 as compared with 1934. However, the rate did not drop down to the average for 1929-1933. The remainder

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†Department of Preventive Medicine, Tulane University of Louisiana.

‡Department of Tropical Medicine, Tulane University of Louisiana.

Dauer, C. C.; and Faust, E. C.: Sou. Med. Jour., **29:757-765, 1936.

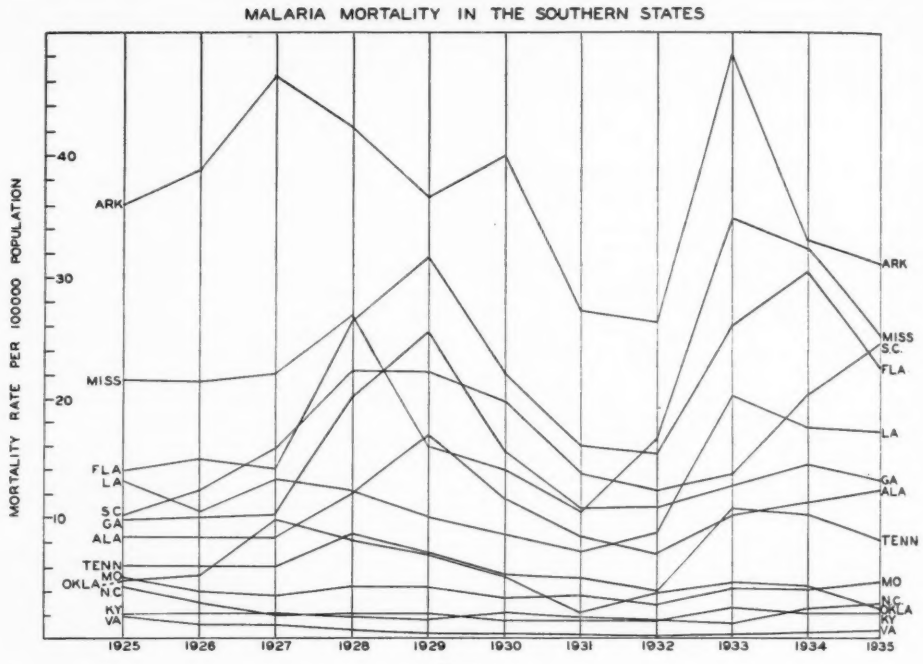

Chart 1

of the State showed a slight increase in mortality. In Mississippi there was a general reduction in mortality in all groups of counties, but most marked in the Delta counties, where the decline amounted to 34 per cent from the previous year. In the western group of counties of Tennessee and Kentucky the mortality rates showed some decline. For the remainder of these states, they increased slightly in Kentucky and decreased in Tennessee.

The eastern endemic area did not experience so general a reduction of mortality as was the case in the Mississippi Valley. Florida showed a 41 per cent reduction in the northern group of counties, but a 73 per cent increase in the southern. In Georgia malaria mortality declined 20 per cent in the southern endemic area and increased about 50 per cent in the remainder of the State. South Carolina experienced a moderate increase in her rates over the entire State. The same condition prevailed in North Carolina and Virginia, namely: a slight but general increase. In the State of Alabama there was some decrease in mortality in the extreme southeastern section, but an increase in the rates for the remainder of the State.

In the small group of counties of northeastern Texas, southeastern Oklahoma and southwestern Arkansas, there was a moderate decline in mortality rates. This section may be regarded as a minor endemic area.

It seems fairly obvious that malaria mortality did not show a great reduction in 1935 except in certain sections of some states. The fact that many areas showed increases causes considerable concern relative to the effectiveness of general control measures.

Exact information regarding the relative proportion of the various types of malaria is not available. In *Table 2* we have tabulated the number of examinations of blood films carried out in the laboratories of several state health departments. The number of positive blood films and the percentage of estivo-autumnal and tertian types are also recorded.

In the laboratories of the Georgia State Board of Health, examination of a large number of blood films from several counties in the southern part of the State have been carried out in the past three years. Fifty-eight per cent of the positive films showed *P. falciparum*, 25 per cent were *P. vivax*, and most of the remainder were undetermined. Among several thousand children, 2.6 per cent of white children had positive films, and 5.9 per cent of colored. Among the positives of white children, 10 per cent were classified as *P. falciparum* and 66 per cent were *P. vivax*. Among the positives of the colored children, 40 per cent were *P. falciparum* and 45 per cent *P. vivax*.

The Tennessee Valley Authority has furnished records covering a period of two years, during which time many blood specimens were examined. Six hundred positive films were found, of which 26 per cent showed *P. falciparum* and 74 per cent *P. vivax*.

Two states have very kindly furnished us with in-

Table 1

MALARIA MORTALITY RATES PER 100,000 POPULATION BY STATES AND BY GROUPS OF COUNTIES, 1929-1933, 1934 AND 1935

States and Location of Endemic Areas	No. of Counties	Population 1930	1929-1933		1934		1935	
			Per Cent Total Malaria Deaths in State	Death Rate Per 100,000	Per Cent Total Malaria Deaths in State	Death Rate Per 100,000	Per Cent Total Malaria Deaths in State	Death Rate Per 100,000
Alabama	68	2,646,248	100	10.5	100	11.1	100	12.3
Southeast	6	187,015	19	26.3	14	25.1	11	19.2
Southwest	8	200,944	18	23.6	10	14.3	14	23.3
Rest of State	54	2,258,289	63	7.2	76	9.8	75	10.8
Arkansas	75	1,854,482	100	34.9	100	32.4	100	30.4
East	21	643,433	52	52.9	60	56.1	62	54.9
Southwest	16	299,869	14	30.7	10	20.0	9	17.6
Rest of State	38	911,180	34	21.4	30	20.0	29	17.3
Florida	67	1,468,211	100	21.9	100	30.3	100	22.5
North Central	35	572,239	79	44.7	86	67.1	68	39.5
Rest of State	32	885,972	21	7.6	14	6.8	32	11.8
Georgia	161	2,908,506	100	14.5	100	14.4	100	12.9
Southern	66	1,054,269	83	33.1	86	34.2	76	27.2
Rest of State	95	1,854,237	17	3.8	14	3.1	24	4.8
Kentucky	120	2,614,589	100	2.0	100	2.4	100	2.4
Western	12	189,266	59	16.3	54	18.0	50	16.9
Rest of State	108	2,425,323	41	0.9	46	1.2	50	1.3
Louisiana	63	2,101,593	100	10.6	100	17.5	100	17.1
Northern	29	799,427	70	19.6	77	36.0	31	14.0
Rest of State	34	1,302,066	30	4.9	23	6.3	69	19.2
Mississippi	82	2,009,821	100	17.8	100	32.1	100	25.7
Delta Counties	11	418,003	44	37.7	43	66.0	35	43.5
Bluff Counties	13	301,519	19	22.7	18	38.8	20	35.1
Rest of State	58	1,290,299	37	10.2	39	19.7	45	17.8
Missouri	114	3,629,367	100	4.0	100	4.2	100	4.7
Southeast	12	269,563	77	42.3	81	56.5	69	44.1
Rest of State	102	3,359,904	23	0.9	19	1.0	31	1.6
North Carolina	100	3,170,276	100	1.6	100	2.5	100	2.9
Coastal Region	27	550,195	51	4.7	39	5.4	51	8.8
Rest of State	73	2,620,081	49	0.9	61	1.8	49	1.8
Oklahoma	77	2,396,040	100	4.6	100	4.4	100	2.5
Southeastern	8	219,643	44	22.1	55	27.3	75	20.0
Rest of State	69	2,176,397	56	2.9	45	2.2	25	0.7
South Carolina	46	1,738,765	100	15.9	100	20.5	100	24.6
Coastal Region	14	421,586	68	47.8	80	67.3	72	73.0
Rest of State	32	1,317,179	32	5.4	20	5.5	28	7.6
Tennessee	100	2,616,556	100	6.4	100	10.1	100	8.1
Western	26	838,150	87	17.4	80	25.3	84	21.3
Rest of State	74	1,778,406	13	1.3	20	3.0	16	1.9
Texas		5,824,715		4.5		7.5		10.8
Northwest	17	411,049		19.2		25.3		23.6
Virginia		2,421,851		0.5		0.4		0.6

Table 2

NUMBER OF EXAMINATIONS FOR MALARIA BY LABORATORIES OF CERTAIN STATE HEALTH DEPARTMENTS, 1935

	Reported Deaths	Reported Cases	No. of Blood Films Examined	Number Positive	Per Cent *P. Falciparum*	Per Cent *P. Vivax*	Per Cent Undetermined
Alabama	327	8632	36,567	3051	25	60	15
Arkansas	564	4007	------	564	21	19	60
Florida	331	813	25,753	2167	31	59	10
Georgia	377	3992	25,433	2698	46	31	23

formation as to types determined in antemortem laboratory diagnosis among reported malaria deaths for 1935. Mississippi reports that only 34 per cent of white deaths were confirmed by laboratory diagnosis. Of those confirmed, 33 per cent were classified as *P. falciparum*, 13 per cent as *P. vivax*, 4 per cent as *P. malariae*, the remainder as undetermined. Twenty-nine per cent of colored malaria deaths were confirmed by laboratory diagnosis. Of these, 21 per cent were *P. falciparum*, 22 per cent *P. vivax*, 2 per cent *P. malariae*, and the remainder undetermined. Florida reports that 40 per cent of all malaria deaths were classified as estivo-autumnal, 21 per cent as tertian, 2.5 per cent as quartan, and the remainder as unspecified.

The above data on types of malaria are most unsatisfactory for various reasons. Much more information should be gathered before any definite conclusions can be drawn regarding the relative incidence of various types in different regions.

Table 3

MALARIA DEATHS IN CERTAIN STATES OUTSIDE SOUTHEASTERN SECTION OF THE UNITED STATES

	No. of Counties Reporting Deaths from Malaria	No. of Deaths from Malaria
Ohio		
1934	4	4
1933	8	8
1932	5	6
1931	6	6
Indiana		
1935	5	7
1934	13	17
1933	11	21
1932	14	15
1931	4	7
Illinois		
1935	32	71
1934	25	60
Kansas		
1935	4	4
1934	5	6
1933	7	8
1932	6	6
1931	4	5
California		
1935	4	6
1934	4	5
1932	3	3
1931	2	5

In the past few years other states outside the southeastern section have noted some increase in malaria (*Table 3*). Localized epidemics have occurred when carriers have been introduced into certain communities where malaria has not occurred for many years.

In the State of California malaria has been present for many years. However, most of the cases in this State which have been recognized as malaria were found in a few counties. Only 4 counties on the average have had a malaria death in the past 4 years.

A few cases have occurred in the arid southwestern states where irrigation projects have been introduced. Deaths, however, have been few in number. In the State of Kansas, since 1931 there have been reported 26 deaths from malaria. In reviewing the histories of these cases which were supplied by the Kansas State Board of Health, one gains the impression that malaria was not always established as the real cause of death. Evidence also suggests that many of the deaths occurred among people who had acquired their infection elsewhere than in Kansas.

Malaria seems to be occurring much more frequently in Illinois than was the case a decade or more ago. In 1934 a total of 60 deaths was reported in 25 counties, and in 1935, 71 deaths in 32 counties. In southern Illinois several of the counties have experienced death rates almost as high as those in eastern Arkansas. A considerable number of deaths has also occurred in central and even northern Illinois. The recrudescence of malaria in Illinois may be due, as has been suggested, to the fact that much submarginal land, once well drained and cultivated, is now lying fallow and is providing ideal breeding places for mosquitoes.

In Indiana there have been 67 deaths from malaria, most of which have been confined to counties along the Ohio River. On the average, deaths from malaria have been recorded in about 10 counties each year. A few deaths have occurred in a few of the counties in southern Ohio.

SUMMARY

An analysis of malaria mortality data for the southeastern United States for 1935 shows a substantial decrease in the rate from the 1933-1934 peak in Arkansas, Mississippi, and Florida; an appreciable decrease in Georgia, Tennessee and Oklahoma; and an increase of considerable proportion in South Carolina, Alabama, North Carolina and Virginia. In these and in the other states considered there was a general tendency for the rate to decline in the heavy endemic foci and to increase in the remainder of the State. Malaria deaths

in certain states outside the southeastern area during the past few years fall into 3 categories: (1) Kansas, in which many of the cases probably acquired malaria outside the State, while in other cases malaria may not have been the cause of death; (2) California, where the deaths have been confined to an average of not more than 4 counties; and (3) Illinois, Indiana, Ohio, where malaria mortality has been reported from the southern part of the State. Present records on blood film diagnosis of the species of plasmodia involved in malaria mortality and morbidity are entirely inadequate and too unreliable for analysis.

ON THE DISTRIBUTION OF *ANOPHELES ALBIMANUS* AND ITS OCCURRENCE IN THE UNITED STATES*

By W. V. KING
Orlando, Florida

Anopheles albimanus Wiedeman is considered to be by far the most important anopheline species in the Caribbean region, being the predominant form in many parts of the area and a highly effective vector of malaria. While preferring fresh water breeding places, open to the sunlight, it is also versatile in its habits, since it may develop freely in brackish or salt water and in quite a wide variety of situations. The unfortunate results of its introduction into new territory has been demonstrated in Barbados, where, as reported by Seagar[15] (1928), it was found for the first time in 1927, accompanied by a severe outbreak of malaria. According to this report, the island had previously been entirely free of anophelines and of malaria infection.

This species has been reported from several points in the extreme southern part of the United States and appears to be established at present in the Brownsville, Texas, area. Because the northern limits of its natural range lie close to our southern borders, an inquiry into the possibility of its establishment in other parts of the South is pertinent. As a preliminary to such an inquiry, it seems worth while to consider briefly the records of its present distribution and their possible application to this question. I am taking the opportunity also to include a few original notes by Dr. George N. MacDonell on the occurrence of the species at Key West, Florida, in 1904.

REPORTED OCCURRENCES IN THE UNITED STATES

For the State of Texas, Dyar[6] first reported the species in 1928, from the Rio Grande Valley. Specimens (20 in all) upon which this record was probably based were recently examined in the United States National Museum. They are labeled from Brownsville, McAllen and Pharr, Texas, and were collected during October and November, 1923, by R. L. Turner. Another specimen in the collection is labeled "Brownsville, on plane, 8. x. 34." Kumm (1929) gives locality records for Brownsville, Harlingen and Rio Hondo, which are reported from a personal communication from R. L. Turner with the statement that the species had not been taken outside of Hildago and Cameron Counties (in the extreme southern tip of the State). Dr. F. C. Bishopp has given me records of two specimens collected at Brownsville and one in Cameron County in January, 1934.

A reported occurrence in Louisiana is based upon a statement by Beyer[3] (1923) that *albimanus* had been taken time and again along the docks at New Orleans on and about fruit vessels from Central and South America. In the absence of specimen material for definite identification, however, this must be regarded as a very questionable record. Howard[11] (1907) stated that *Anopheles argyrotarsis* had been taken in New Orleans, but the record was not repeated in later references to mosquitoes and was probably dropped as a doubtful identification.

In Florida, Gardner[9] (1904) reported very briefly the collection of *Anopheles albipes* by Mr. (now Dr.) George N. MacDonell at Key West, the identification having been confirmed by the Bureau of Entomology, United States Department of Agriculture. The specimens furnished at that time were later determined as *Anopheles albimanus* and were recorded under this name by Howard, Dyar, and Knab (1917) and by Dyar (1922), although the credit for the collection was given in error to Dr. Gardner instead of Dr. MacDonell.* Two of the specimens are still in the National Museum collection at Washington. While no further report of this occurrence has been published, some of the original notes and correspondence, copies of which have recently been furnished the writer by Dr. MacDonell, are of interest and are referred to here with his permission. The notes show that the first specimen was collected in a residence on July 29, 1904, and identified by him as *Anopheles argyrotarsis* subspecies *albipes* (a name later recognized as a synonym of *albimanus*). An intensive search was initiated immediately and continued until August 20, by which time the number of adults obtained had reached a total of 131 (2 males and 129 females). Most of these were taken in stables within a single city block, although a few in addition to the first specimen were found in residences. The breeding place could not be discovered. Dr. MacDonell suggested that the captured adults were the progeny of a single female, possibly brought by vessel from Vera Cruz, Mexico. Assuming that the number of males produced was equal to the number of females, the total would indicate either that two or more batches of eggs had been deposited by the one female or that more than one female was involved.

The species has not again been reported from the area and was apparently completely eliminated. Dr. MacDonell has also called my attention to the fact that this was probably the first occurrence of any species of *Anopheles* at Key West. He quotes from a published statement by Surgeon R. D. Murray in 1902 to the effect that search for *Anopheles* during the previous two and a half years had assured him that none was present. From my personal observation, breeding conditions on the Key do not appear to be very favorable for the perpetuation of anophelines.

Another record for Florida is furnished by Griffitts[10] (1931), who reported taking the species in Miami dur-

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*Read before National Malaria Committee (Conference on Malaria), meeting conjointly with Southern Medical Association, Thirtieth Annual Meeting, Baltimore, Maryland, November 17-20, 1936.

†From the Division of Insects Affecting Man and Animals, Bureau of Entomology and Plant Quarantine, United States Department of Agriculture.

*Gardner stated that sole credit belonged to Mr. MacDonell, and the unintentional error on the part of the authors mentioned should be corrected in future references.

ing the routine inspection of airplanes arriving from Southern ports. The route of the airplane or whether more than one specimen was found was not recorded.

TROPICAL DISTRIBUTION

Howard, Dyar, and Knab (1917) gave the distribution of *albimanus* as "Continental America from Mexico to Ecuador and the Greater Antilles; southern Florida." The present known distribution is still within the same general region, although a number of areas have been added to the list as given. These include Colombia, Venezuela, and several places in the Lesser Antilles (Guadalope, Barbados, Trinidad, and so on). The species has been reported from Brazil, but in the light of more exact identification all of the reports for that country are now believed to refer to other species (Cf. Root,[14] 1926, and others). Root (ibid) mentions it as probably extending into Argentina, although this was evidently not based on specimen records, and none of the recent authors include it in the list of anophelines found there. Apparently, therefore, the species has not been found south of the equator except in Ecuador.

The record for Ecuador is based upon its collection at Guayaquil by F. Campos[4] and the *albimanus* material in the National Museum collection contains one undated lot of specimens from him. A recent examination by Dr. Alan Stone and the writer of the male genitalia of two of the specimens from this lot confirms the identification. Other than this, little information is available as to the occurrence there of this species. A later shipment of material to Washington did not contain specimens of *albimanus*, according to Dyar (1925). Campos[5] (1921) included it in one list of the mosquitoes of Ecuador, but omits it in a later list (1925). In the later article he states that *A. tarsimaculatus* (which is very similar in appearance to *albimanus*) is the chief species throughout the year in the vicinity of Guayaquil. Specimens collected in Ecuador in March, 1936, by Dr. Henry Hanson were forwarded to the Bureau of Entomology and Plant Quarantine and identified by Dr. Alan Stone as *A. albimanus*. One of the lots had been taken in a hotel room in Guayaquil and one in a bed net at Daule on the Daule River. In a personal communication to the present writer, Dr. Hanson mentioned that *albimanus* was the principal anopheline observed by him.

For Colombia and Venezuela, the records of albimanus seem to be limited to the northern coast. With reference to the latter country, Benarroch[2] (1934) states that it is common on this coast, but does not extend very far inland. It is said to be the principal carrier of malaria in the coastal areas of both countries.

The species was reported from Trinidad by Beattie[1] (1932), although the prevalent anopheline there was found to be *A. tarsimaculatus*. De Verteuil[16] (1931) did not record *albimanus* during a year's survey in western Trinidad (including Port of Spain), so its occurrence must be very limited in the island. Moreover, Trinidad appears to be the farthest extension of the species in a southeasterly direction, as I find no authentic record for the Guianas and, as stated previously, the Brazilian reports are thought to have been in error.

From a perusal of the literature the chief characteristics of the local distribution of *albimanus* are shown to be a warm damp climate and low altitudes. Except in Trinidad and Ecuador, it is usually the predominant anopheline in the coastal areas and lowlands throughout its range, but it is replaced by other species in dry climates and at higher elevations. The latitude most favorable for its existence, judged on the basis of prevalence, extends from central Mexico to Panama and the northern coast of South America, or from about 24° to 8° north latitude. It has been found as far north as 26° (southern Texas) and south to about 3° south latitude (south-central Ecuador). Its effective range is practically limited at the present time to the Caribbean and Mexican regions.

CLIMATIC LIMITATIONS IN THE UNITED STATES

The distribution records for *albimanus* show that the only places where it has approached the temperate zone are in northeastern Mexico and southern Texas. The situation in northeastern Mexico, however, is of little assistance in determining the low temperature limitations to its dispersion, since the climate is probably too dry to favor its extension inland, irrespective of temperature. This restricts the inquiry to the Texas records as a source of information in this connection, and the conditions there may be briefly compared with those of other sections of the United States.

The normal rainfall rate in the Brownsville area would seem to be unfavorably low for *albimanus* (less than 30 inches annually), but irrigation and coastal marshes presumably supply the required conditions for the limited amount of breeding. The Weather Bureau records show the normal annual mean temperature for Brownsville to be 73.1° F., with an average monthly mean for December and January of 60.5°. At Corpus Christi, approximately 100 miles farther up the coast, where the species has not been reported, the annual mean is 70.4° and the average for December and January is 56.9°. The conditions in the Brownsville area are assumed to represent the minimum climatic requirements for the species, and temperatures corresponding to those found there are not encountered elsewhere in the United States except in peninsular Florida. A comparison of the Texas localities with the most southerly coastal stations in Louisiana and California and with several sections of Florida is shown in *Table 1*.

As may be noted from the table, only the extreme southern section of the Florida east coast exceeds in temperature the 73° annual mean of Brownsville and Harlingen, although the west coast average is but slightly less, and three of the six stations (St. Petersburg, Punta Gorda and Ft. Myers) are above that figure. The annual means in Florida, however, are reduced several degrees as compared with Texas by the lower summer temperatures, and on the basis of the coldest weather in the year, which is more likely to be the determining factor, we find that a large portion of the coastal area has December and January averages above 60°. This section extends from Daytona on the east coast to Tarpon Springs on the west coast, while all the stations on the lower east coast, from Ft. Pierce to Homestead, have averages above 65°. The rainfall in Florida would also appear to be much more favorable than at Brownsville.

Judging from this comparison, climatic conditions in a considerable section of Florida, perhaps as far north as the twenty-eighth parallel, might prove to be more or less favorable for the existence of *albimanus*. Further evidence that would tend to support this view is to be found in the distribution of four tropical species of mosquitoes that already are found in southern Florida.

Table 1

NORMAL MEAN TEMPERATURE AND RAINFALL AT SELECTED STATIONS IN THE EXTREME SOUTHERN PART OF THE UNITED STATES

	Temperature		Rainfall
	Dec.-Jan. Average	Annual Mean	Annual Mean
	°F.	°F.	Inches
Brownsville, Texas	60.5	73.1	27.4
Harlingen, Texas	59.9	73.4	26.4
Corpus Christi, Texas	56.5	70.6	26.4
San Diego, California	55.1	61.0	10.3
Burrwood, Louisiana	57.4	70.2	52.8
New Orleans, Louisiana	54.8	69.4	57.5
Florida west coast:			
Tarpon Springs to Fort Myers (6)*	62.3	72.5	51.4
Florida east coast:			
Fernandina to St. Augustine (3)	56.1	69.1	49.1
Daytona to Merritt Island (4)	60.9	71.2	50.0
Ft. Pierce to Homestead (7)	67.1	74.4	58.7

*The numbers of stations from which the records were averaged are shown in parentheses.

These species are *Deinocerites cancer* Theobald, *Mansonia titillans* Walker, *Wyeomyia mitchellii* Theobald, and *Wyeomyia vanduzeei* Dyar and Knab, the last three of which have been taken as far north as Orlando (about 28°30′) and have been found in comparative abundance between latitudes 28 and 27. The fourth species, *D. cancer,* has been taken as far north as Vero Beach. Like *A. albimanus,* three of these species are also normally restricted to the Caribbean area.

While this rather meager evidence by no means proves that *albimanus* could propagate actively in southern Florida, if introduced, it is sufficiently suggestive to indicate a possible danger and the need for further study of the climatic and other factors affecting its distribution. Attention may be called to the fact that the southern half of Florida at present is largely free of malaria, due no doubt to the fact that the prevalent anopheline, *A. crucians,* is of little importance in the transmission of the disease. The introduction and establishment of an effective vector in this area, therefore, would be particularly unfortunate.

REFERENCES

1. Beattie, Mary V. F.: The Physico-Chemical Factors of Water in Relation to Mosquito Breeding in Trinidad. Bull. Ent. Res., **23**:477-496, 1932.
2. Benarroch, E. I.: Estudios relativos al paludismo en Venezuela. Observaciones Acerca de los Zancudos Transmisores. 15 pp. Caracas, Venezuela, 1934. (Quoted in Rev. App. Ent., B, **22**:239, 1934.)
3. Beyer, Geo. E.: The Mosquitoes of Louisiana. Quart. Bull. La. State Board of Health, **14**:54-84, 1923.
4. Campos, F.: Estudios Sobre la Fauna Entomologica del Ecuador. 2° Dipteros Nematoceros: Fam. Culicidae (Mosquitos). Rev. Col. Nac. Vicente Rocafuerte, Guayaquil, Ecuador, No. 5, pp. 20-30, 1921. (Quoted by Dyar, 1925.)
5. Campos, F.: Estudios Biologicos Sobre los Mosquitos de Guayaquil y Alrededores. Rev. Col. Nac. Vincente Rocafuerte, 7 (21-22):3-49. Guayaquil, Ecuador, 1925. (Quoted by Rev. App. Ent., B, **14**:152, 1926.)
6. Dyar, Harrison G.: The Mosquitoes of the United States. Proc. U. S. Nat. Mus., **62**:119, 1922.
7. Dyar, H. G.: Some Mosquitoes from Ecuador. Ins. Ins. Mens., **13**:27-31, 1925.
8. Dyar, Harrison G.: The Mosquitoes of the Americas, 616 pp, Washington, D. C., 1928.
9. Gardner, C. H.: *Anopheles* Mosquitoes Found at Key West, Fla. Pub. Health Reports, **19**:1651, 1904.
10. Griffitts, T. H.D.; and J. J.: Mosquitoes Transported by Airplanes. Public Health Reports, **46**:2775-2782, 1931.
11. Howard, L. O.: Mosquitoes. Osler's Mod. Medicine, **1**:370-391, 1907. (Quoted by Howard, Dyar, and Knab, 1917.)
12. Howard, Leland, O.; Dyar, Harrison G.; and Knab, Frederick: Mosquitoes of North and Central America and the West Indies. **4**:525-1064, 1917; Washington, D. C.
13. Kumm, Henry W.: The Geographical Distribution of the Malaria Carrying Mosquitoes. Amer. Jour. Hyg., Monographic Series No. 10, 178 pp., 1929.
14. Root, Francis Metcalf: Studies on Brazilian Mosquitoes. I. The Anophelines of the *Nyssorhynchus* Group. Amer. Jour. Hyg., **6**:684-717, 1926.
15. Seagar, E. A.: Malaria in Barbadoes. Trop. Agri., **5**:48-50, 1928. (Quoted in Rev. App. Ent., B., **16**:119, 1928.)
16. Verteuil, E. de: Malaria Survey. Counc. Pap. Legis. Counc, Trinidad and Tobago, No. 97. Port of Spain, 32 pp., 1931. (Quoted in Rev. App. Ent., B, **20**:267, 1932.)

DISCUSSION (*Abstract*)

Dr. George N. MacDonell, Miami, Fla. — Referring to the original collection of *Anopheles albimanus* at Key West in 1904, a page from my note book, written at that time, records the happenings in chronological order as follows:

"July 29, 1904.—Captured first specimen (583) in lighted room at 10:00 p. m. Identified as *Anopheles argyrotarsis* subspecies *albipes,* female. Window of room open to east wind which was blowing across a fresh water pond 350 yards distant.

"July 30.—Captured second specimen (593) in Seminary stable and notified Dr. Maloney, local Health Officer.

"August 1.—Captured three specimens (594-596), one in my bedroom at 9:00 p. m. and one in Mr. W. Morton's stable. Searched surrounding ponds but found no larvae.

"August 2.—Captured three specimens (597-599) in the Morton stable. Sent by mail two specimens to Dr. L. O. Howard, Bureau of Entomology and two specimens to Dr. H. F. Harris, Secretary, Georgia Board of Health, a former instructor and personal friend.

After mailing letter and specimens to Dr. Howard, I showed specimens to Dr. Fogarty, practicing physician, Dr. Plummer, in charge of the Key West Naval Station, Dr. Gardner, P.A. Surgeon in charge of Marine Hospital, Mr. Stier, Clerk and Paymaster of Marine Hospital, and Dr. Barnes, Contract Surgeon, Marine Hospital.

"August 3.—Captured twelve specimens in Morton's stable. Gave several specimens each to Dr. J. Y. Porter, State Health Officer of Florida, Drs. Plummer, Fogarty and Maloney. Many of mosquitoes filled with blood. Searched several ponds but found no larvae."

I continued finding specimens until August 20, after which time I had to leave Key West. In all, I found 131 *Anopheles albimanus,* of which only two were males. All were found practically within the range of a city block and were probably the hatch from eggs laid by the first mosquito arriving in Key West. My search was so intensive and thorough, combing every possible hiding place, that I have reason to believe that I exterminated the breed. At any rate, no more were found, although Dr. Plummer told me he searched diligently. None have been reported from Key West since then.

In so doing, I probably checked what might otherwise have been an invasion of the Keys and the mainland by the chief vector of malaria in the West Indies. Thus, as a medical student, I performed what is probably my best contribution to preventive public health work.

Dr. D. P. Curry, Ancon, Canal Zone.—The distribution of *albimanus* is an interesting and perplexing problem. It is, of course ubiquitous in the Canal Zone where fresh water and sunlight abound, but its presence in salt water of any high degree of salinity is usually accidental, generally occurring where a high

tide has invaded a fresh water breeding place. In the large brackish swamps of the Atlantic side its place is taken by *tarsimaculatus*.

Why *albimanus* has not invaded the Lesser Antilles and the coastal region of South America beyond La Guaira has been discussed frequently, without seemingly adequate explanation. It has been doubted if it was really the species that caused the recent epidemic of malaria in Barbados and I do not know whether larval or genitalic identifications were made. The reports of *albimanus* from Trinidad are also uncertain. For some years de Verteuil has been sending specimens to Edwards and to me and I know of no specimens of the species having been taken there in recent years. Nor does de Verteuil report it in his annual reports.

A most interesting problem here is the dispersal of breeding of the two species, *albitarsis* and *albimanus*, in the inlets of Gatun Lake. Until recently *albitarsis* bred only in the southwestern part of the lake, the larvae sometimes being collected 200 or more at a dip, in the proportion of 20 *albitarsis* to one *albimanus;* whereas in almost similar locations in the northeastern area, *albimanus* alone were collected in the same great numbers. A few weeks ago, however, we took a single larva of *albitarsis* (from which an adult male was bred) in the Gatun River inlet of the northeast section. At the same time about 40 *albimanus* larvae were collected.

Mr. W. H. W. Komp, United States Public Health Service, Ancon, Canal Zone.—I visited the island of Trinidad during the past summer, and had the pleasure of going over most of the island with Dr. Eric de Verteuil and Prof. F. W. Urich. We did not find *albimanus*, and de Verteuil believes, on the basis of many collections and long-continued observations, that it does not occur there. It was not found by me during two visits, a year apart, to eastern Venezuela, near the mouth of the San Juan River, of the Orinoco drainage. Dr. Rolla Hill reports it from the region around Maracay, Venezuela, at altitudes of about 2,000 feet. It has also recently been reported from Guatemala City, at 4,500 feet, by Dr. Romeo de Leon. *Albimanus* occurs well up the Magdalena River in Colombia, and also occurs in Guayaquil, Ecuador, as I proved by the examination of males from this locality. C. H. T. Townsend reports it from Rio Tapajos, Brazil, but I have seen his material so labeled in the U. S. National Museum, and it is *bachmanni* Petrocchi.

Dr. F. W. Edwards, of the British Museum, has written me as follows concerning Miss Beattie's record of *albimanus* from Trinidad: "In regard to *Anopheles albimanus* in Trinidad, I think some mistake must have been made either by me or by Miss Beattie. There are no specimens from the Island in our collection, and I expect the determination was in error for *albitarsis*." So the eastern limit of *albimanus* along the northern coast of South America seems to be the Lake Valencia region in Venezeula.

Regarding its reported connection with the epidemic of malaria in Barbadoes in 1927, I made many inquiries while in Trinidad to determine whether any *Anopheles* material collected during the outbreak was still extant. None could be found, and de Verteuil informed me that when Seagar, who is a medical man, not an entomologist, was questioned concerning his diagnosis of the species, he freely confessed that the mosquito he found in Barbadoes might have been *tarsimaculatus*, not *albimanus*. Mr. L. B. Assang, Chief Sanitary Inspector of the malaria survey of Trinidad, who visited Barbadoes at the time of the epidemic, told me that he believes the mosquito involved was *tarsimaculatus*, on the basis of his later knowledge of this species in Trinidad. In the absence of direct evidence of the presence of *albimanus* in either Trinidad or Barbadoes, I believe we are safe in assuming that the mosquito found there is not *albimanus*, but really *tarsimaculatus*.

One of the mysteries of Anopheline distribution is the fact that *albimanus* occurs with *Anopheles darlingi* in north central Venezuela, but apparently does not extend down the eastern coast, while *darlingi* apparently does not extend farther west, and has never been found in the Canal Zone.

THE RELATION BETWEEN BREEDING AREA, *ANOPHELES ALBIMANUS* DENSITY, AND MALARIA IN SALINAS, PUERTO RICO*

By WALTER C. EARLE, M.D.†
San Juan, Puerto Rico

Observations of mosquito density and malaria prevalence have been carried on at Salinas, Puerto Rico, for almost ten years, both before and after the institution of malaria control work. It is possible, therefore, to obtain some information upon the relation between the mosquito breeding areas, anopheles density, and malaria prevalence, particularly through a study of the effect of the gradual removal of breeding areas in the course of control work. It is of great importance to determine how much of the breeding area needs to be brought under control to reduce the anopheles density to a satisfactory low point.

As will be seen from the accompanying map, the Salinas area comprises a small village on the beach and the town proper on the main road about a mile from the seashore. To the east of the town, between the main road and the ocean, there are approximately 450 acres of land with the water table practically at the surface. This land is extensively ditched for the raising of sugar cane, so that there may be between one-half and one mile of ditches in each acre. Between the cane fields and the ocean are a large mangrove swamp at the eastern border of the controlled area and a small one near the beach village. To the west of the town there are two mangrove swamps, one on each side of the main road. Immediately adjacent to the town is the Lapa River, which under certain conditions is a prolific source of mosquitoes.

The first subsoil drainage work was done at the east end of the controlled area in 1930, when tile drains were installed in a 46-acre area at Colonia Magdalena, and in a small area in Colonia Margarita immediately adjacent to the town. During 1931, practically all of Magdalena was supplied with tile drains, and a start was made in Carmen; so that by the middle of 1932 about 225 acres, or a little more than half of the wet cane fields to the east of the town, had been drained (*Chart 1*). In 1932 drainage operations were begun on a larger scale: the remainder of the fields that could be drained by gravity were provided with tile drains, and a pump was installed for drainage of the two mangrove swamps to the west of the town as well as the adjacent springs.

Early in 1933 most of the wet areas in Isidora to the west of the town were connected with the pumps, and a system of pumps was installed at Colonia Carmen so that the mangrove swamps and remaining wet cane fields could be drained. By the middle of 1933 tile

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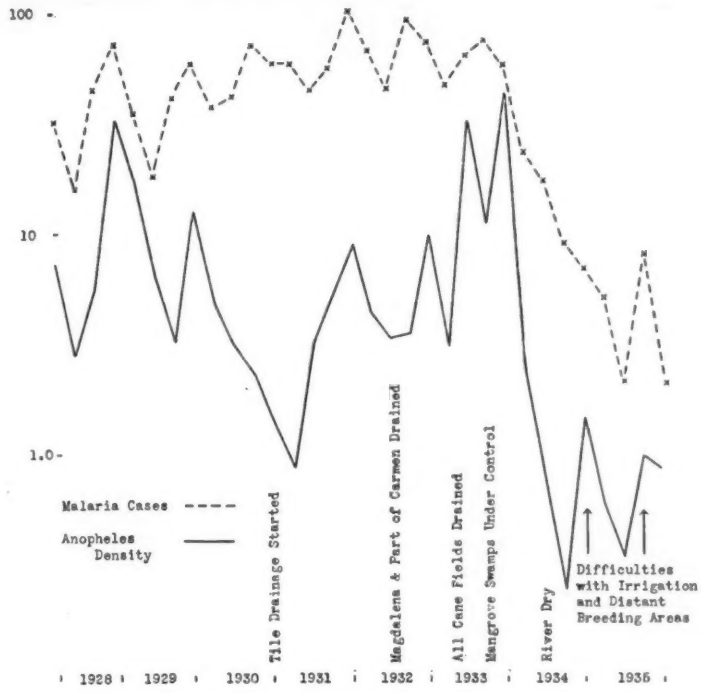

Chart 1
Malaria Cases and Anopheles Density in Salinas, Puerto Rico, 1928-1935.

drains had been laid in most of these cane fields, and by November the mangrove swamps were under control. In November practically the only breeding areas not under control were the river and bayous near the ocean. The greater portion of the river bed was finally dried by a concrete pipe laid well beneath the surface of the ground during the first half of 1934, so that in the latter half of that year the only problems remaining were the bayous, certain difficulties associated with the irrigation of sugar cane fields, and areas outside the controlled zone which might possibly have been near enough to enable mosquitoes at times to reach the town.

Continuous records of mosquito density and malaria prevalence in Salinas since 1927 are available, so that it is possible to study the effect of these operations (*Tables 1* and *2* and *Chart 1*). In 1932 neither mosquito density (*Table 1*) nor malaria prevalence (*Table 2*) had been greatly affected in spite of the fact that 110 acres had been drained at the beginning of the year and 115 more, as well as part of the mangrove swamps, during the rest of the year.

The year 1933 was relatively wet, but in spite of heavy rains none of the areas which were drained ever held water for more than two or three days. The highest mosquito density of any year and the usual amount of malaria appeared in spite of the fact that the breeding areas had been reduced by at least 90 per cent. At the end of the year the river was practically the only large breeding area left. During the early part of the following year the greater portion of the river was dried up, and since the breeding areas had now been reduced to a minimum, the few bayous and isolated wet spots remaining could be easily controlled with Paris green.

The year 1934 was another dry year, comparable to 1929 and 1930, but it was difficult to control the mosquitoes in the few remaining breeding areas and in irrigation water. The mosquito density finally reached a low figure toward the end of February. Average catches were less than one mosquito per month per trap until October, when rather high catches were made at one end of the town. The cause of the trouble was finally located in a three-acre irrigation reservoir just outside the zone under control. More than 600 anopheles were caught there in one trap in one night. This reservoir was immediately brought under control and observations of all irrigation canals and reservoirs were intensified, so that finally the last main breeding area was rendered definitely harmless. *Table 1* indicates that it was not until June, 1934, that a lower density of mosquitoes was consistently maintained and not until this low density had been maintained was there any indication that malaria prevalence would be reduced.

It is thus seen that in the presence of adequate rains mosquito density was not seriously affected until practically all of the breeding areas were drained or controlled by larvicides. Even with a rather low rainfall,

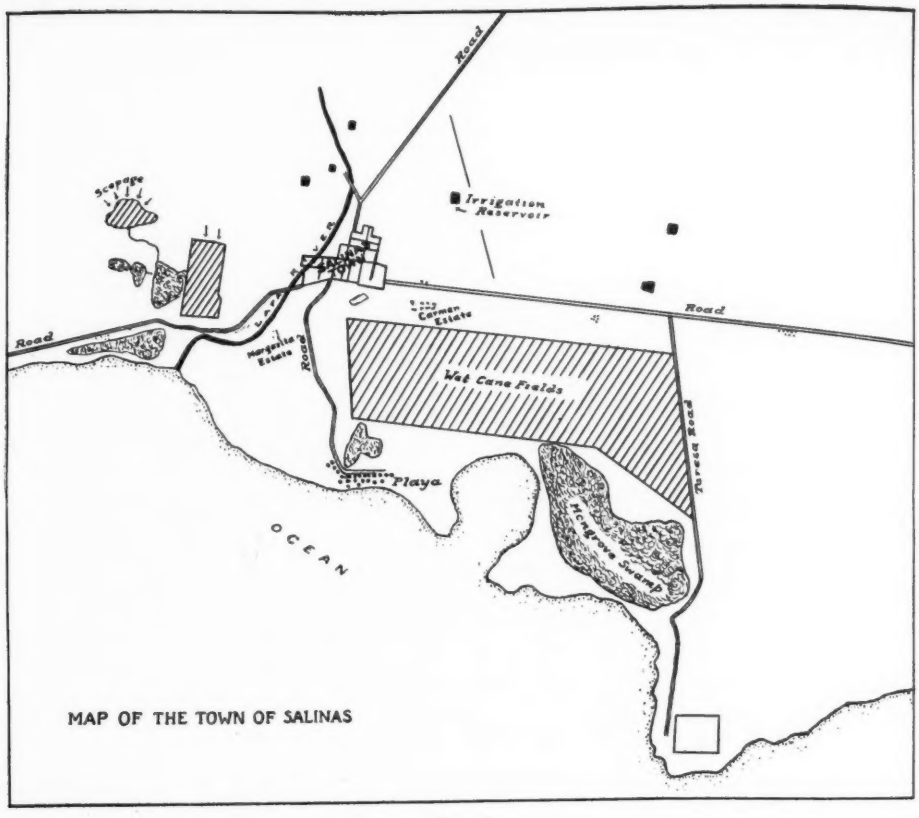

Chart 2

Table 1

AVERAGE *A. ALBIMANUS* TRAP CATCHES IN SALINAS, INSIDE ZONE

Month	1928	1929	1930	1931	1932	1933	1934	1935
January	6.50	17.21	1.84	0.28	5.55	3.06	5.33	0.87
February	8.46	27.08	7.77	0.60	2.79	4.13	1.08	0.60
March	8.98	9.61	5.16	1.75	5.04	1.82	0.30	0.33
April	3.81	5.36	1.24	.79	2.00	1.71	0.82	0.09
May	.63	2.90	1.88	1.30	3.00	5.26	0.93	0.13
June	3.79	11.00	6.57	7.71	4.85	38.36	0.54	0.79
July	2.52	6.13	2.84	10.68	3.00	13.0	0.25	0.29
August	5.10	1.40	1.04	1.95	1.60	11.09	0.13	0.25
September	9.36	2.34	3.30	3.28	6.15	8.67	0.33	2.43
October	25.39	21.87	1.34	4.65	15.22	23.29	2.06	2.17
November	46.50	12.72	1.65	10.70	7.26	63.08	1.68	0.25
December	33.40	4.57	1.31	11.00	6.93	40.65	0.92	0.08
Average	12.87	10.18	3.00	4.56	5.28	22.14	1.20	0.82

Table 2

TOTAL MALARIA CASES IN SALINAS, INSIDE ZONE

Month	1928	1929	1930	1931	1932	1933	1934	1935
January	38	65	48	89	89	61	14	10
February	26	36	29	57	57	32	22	3
March	20	8	36	34	60	48	34	2
April	13	13	40	46	43	47	23	—
May	16	23	33	40	32	77	16	1
June	18	18	54	48	60	69	12	4
July	45	52	71	67	85	95	13	19
August	49	48	63	58	123	86	10	2
September	45	29	86	43	78	42	4	4
October	37	56	73	62	72	81	3	5
November	98	64	46	62	82	54	3	2
December	87	58	62	189	61	38	15	—
Total	492	470	641	795	842	730	169	52

Table 3

TOTAL RAINFALL, IN INCHES, AT SALINAS, 1928-1935

Year	1928	1929	1930	1931	1932	1933	1934	1935
Rainfall in inches	39.46	19.72	19.20	45.46	41.52	48.75	18.20	33.66

Table 4

MALARIA CASES IN CHILDREN UNDER ONE YEAR OF AGE AT SALINAS, INSIDE ZONE, 1928-1935

Year	1928	1929	1930	1931	1932	1933	1934	1935
Cases	12	2	4	3	5	5	0	0

success would have been imperiled had we not kept the irrigation systems under strict control and extended operations somewhat farther than previously seemed necessary.

DISCUSSION

In some regions of endemic malaria the potential breeding area of mosquitoes is far greater than is necessary to maintain a high mosquito density. The mosquito density is also higher than is necessary to maintain the high parasite rates. Not only are all types of breeding areas represented, some important in rainy weather, others important in dry weather, but there are usually several examples of each type. In malaria control work, neither the mosquito density nor the malaria prevalence will be affected until practically all of the breeding areas have been brought under control. Where dependence must be placed on engineering methods which may require several years for their application, definite results cannot be expected until the control of the last breeding area has been brought about. In view of this fact it probably makes little difference in what order the breeding areas are handled.

SUMMARY AND CONCLUSIONS

Observations of antimosquito work at Salinas, Puerto Rico, are reported which indicate that it was necessary to bring practically all of the enormous breeding area under control before the mosquito density was definitely reduced. The malaria prevalence was not affected until this mosquito density was brought down and maintained at an extremely low figure.

DISCUSSION (*Abstract*)

Dr. R. B. Watson, Medical Officer, Tennessee Valley Authority, Norris, Tenn. — In September, 1935, it was my pleasure to accompany Dr. Boyd on a trip to Puerto Rico for the purpose of observing Dr. Earle's malaria control program. Dr. Earle has given an account of his malaria control operations in the vicinity of Salinas and their effect on anophelism and endemic malaria in this area. There is very little for me to say in discussion of his paper: the results speak for the efficiency of the work. However, there are a few considerations which I wish to emphasize.

Salinas is located in the narrow, southern coastal plain of Puerto Rico. East and west of the town the plain stretches for many miles, with little relief, and most of it is planted to sugar cane, a crop which requires irrigation in this region. There is a dense rural population which is partly collected into work colonies; and here and there is an occasional small village. The water table is quite near the surface of the ground, and seepage occurs into almost any depression. *Anopheles albimanus* will breed in almost any collection of water, even brackish water. Thus the Salinas area is a part of a region where *A. albimanus* breeds profusely; where anophelism is to some extent a by-product of agricultural methods; and where malaria has been endemic for many years.

Dr. Earle tells me that he originally planned to have a control zone around the town of Salinas with a radius of one mile. Satisfactory results were not obtained, and early in 1935 control operations were extended one-half mile. This gave satisfactory results for about ten months of the year, but with the onset of rains mosquito densities in the control zone would begin to rise. The control zone has therefore been extended for two miles east and west of the town, and for the past two years mosquito densities in this zone have been very low.

It appears that it is necessary to maintain constantly a very low *A. albimanus* density, an average of about one mosquito per trap collection over a two-year period, to lower the malaria rate in Salinas. During 1930 and 1931, the average trap catch was

less than four mosquitoes, yet there was no marked change in the amount of malaria in Salinas during this period. This observation induces speculation as to whether or not something quite similar might be true for *A. quadrimaculatus* densities and endemic malaria in this country. I have tried to obtain specific information on this point without success, but our observations in northern Alabama during the past summer led us to believe that this may indeed be the case.

The records of mosquito density shown by Dr. Earle give the average catch for all traps in the control zone by months. I should like to inquire whether he noted any differences in the size of the catches from traps at the periphery of the zone, and from those midway of the zone and near the town itself. This inquiry is based on the belief that almost perfect control of breeding was secured in the area under control during 1934-35; and on the speculation that mosquitoes collected may have come into the control zone from breeding places outside of the zone of control operations. If this was really the case, then it seems that evidence is presented which indicates that dispersion of *A. albimanus* is between 1.5 and 2.0 miles under conditions existing at Salinas.

My very short visit to Puerto Rico left me impressed with the adaptability of this mosquito; and with the difficulties attending the control of malaria disseminated by it. Dr. Earle's approach to the problem at Salinas by the use of engineering methods has materially benefited the cane growers, while reducing the amount of endemic malaria.

ON *ANOPHELES ALBITARSIS* LYNCH ARRIBALZAGA IN PANAMA*

By L. E. ROZEBOOM†
Panama, R. de P.

The studies of recent years, particularly in Europe, on the epidemiology of malaria have demonstrated the importance of Anopheline races in the transmission of the disease. Evidence has been accumulating that in the New World also some of the species of *Anopheles* are divided into distinct races. Townsend[5] (1933), referring to the work of Hackett, Martini, and Missiroli, stated:

"What we need in America, and particularly in South America, is work along similar lines on our *Nyssorhynchus* species. * * * It seems clear that we shall be able to define the *Nyssorhynchus* forms satisfactorily only by recognizing geographical and physiological races as separate entities and adopting them as our basis of treatment."

Anopheles albitarsis was first reported as being present in Panama by Curry[1] (1932), who said:

"It, too, may prove to be an important vector of malaria."

Later, after additional observations had been made, this author (1934) stated:

"*A. albitarsis* * * * is never taken on the wing or in houses or in the act of biting, even in the immediate vicinity of the most prolific breeding places. It seems to ignore man entirely as a source of blood."

During the past year I have fed *albitarsis* a number of times on man, and was impressed by the marked indifference exhibited by the females to human blood, even under experimental conditions. In contrast with this, in some areas in South America this species is considered to be a malaria vector. Root (1926) believed that epidemiological evidence suggested that it was a dangerous mosquito in Brazil. Davis[2] (1931) said:

"The '*brasiliensis*' of Boyd was undoubtedly *A. albitarsis*, as was the '*brasiliensis*' found infected by Godoy and Pinto."

Kumm[3] (1932), working in the City of Bahia, reported that

"Between March 27 and April 10, 423 adult *A. albitarsis* were captured in houses. * * * We dissected 240 midguts successfully and found oocysts in fourteen, or 5.8 per cent."

For more than a year I have collected *albitarsis* larvae at least once a month from patches of *Chara, Naias* and *Utricularia* in the southwestern arm of Gatun Lake, and at the same time several hundred eggs were collected, taken to the laboratory, and examined under the microscope. The eggs were identified by breeding out larvae from them, and by obtaining infertile ova from females which had been positively identified by the absence of a black ring on the fifth hind tarsal joint, and by the possession of the two rows of white scales on the first abdominal sternite.

In view of the fact that there seems to be a considerable discrepancy between the biting habits of the females of the Panamanian and Brazilian forms, it is of interest to point out that the eggs of the *albitarsis* of Panama are entirely different from those of the coastal Brazilian *albitarsis* described by Root (1926). According to this author, in the Brazilian form,

"* * * the floats of the two sides meet and fuse at their anterior and posterior ends,"

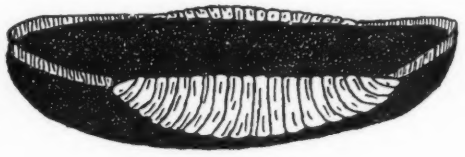

Fig. 1
A. *albitarsis* (Panama.) Dorso-lateral view.

and there are from 34 to 38 float ridges. *Fig. 1* shows that in the Isthmian form the floats are small, widely separated and have approximately 20 float ridges. The broad frill, present on both the anterior and posterior parts of the egg, is continuous with the ends of the floats; it borders the dorsal surface and becomes gradually wider as it approaches the ends of the egg. It has no resemblance whatsoever to the peculiar crown-like structure pictured by Root. Finally, Root stated that in the *Nyssorhynchus* group

"* * * one finds the whole ventral and lateral portion of the egg studded with little white stars, each consisting of eight or ten lines radiating from an imaginary common center."

Save for *tarsimaculatus* and *argyritarsis*, I have examined the ova of all the members of the *Nyssorhynchus* group of Panama, and all, with the exception of *albitarsis*, have rows of silvery spots on the ventral and lateral surfaces, which doubtlessly are Root's[4] "little white stars." In *albitarsis*, however, the dorsal, lateral and ventral surfaces are uniformly black.

The differences in the blood-feeding habits of Brazilian and Panamanian *A. albitarsis*, and the marked dissimilarity in the morphology of the eggs of this species

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*Read before National Malaria Committee (Conference on Malaria), meeting conjointly with Southern Medical Association, Thirtieth Annual Meeting, Baltimore, Maryland, November 17-20, 1936.

†Medical Entomologist, Gorgas Memorial Laboratory.

in Panama as compared with that of the ova described by Root, indicate that *A. albitarsis* is divided into at least two separate races.

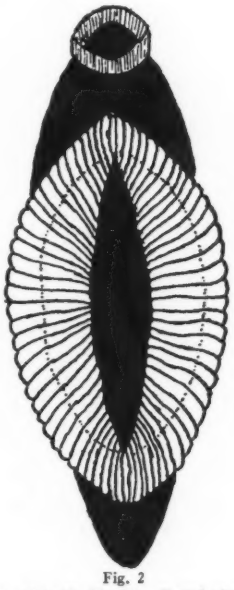

Fig. 2
A. *albitarsis* (Brazil). Dorsal view. Redrawn from Root (1926).

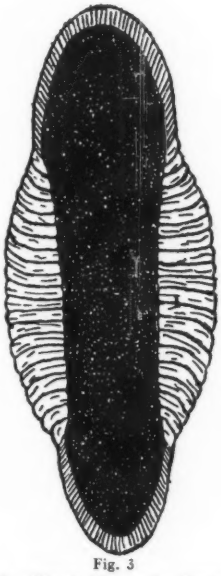

Fig. 3
A. *albitarsis* (Panama). Dorsal view.

REFERENCES

1. Curry, Dalferes P.: Some Observations on the *Nyssorhynchus* Group of the *Anopheles* (*Culicidae*) of Panama. Amer. Jour. Hyg., **15**:566-572 (see footnote, page 566) 1932.
1934 Breeding of Anopheline Mosquitoes Among Aquatic Vegetation of Gatun Lake, Accompanied by Periodic Long Flights of *A. albimanus* Wied. Sou. Med. Jour., **27**:7, 644-651, 1934.
2. Davis, Nelson C.: A Note on the Malaria-Carrying Anophelines in Belem, Para, and in Natal, Rio Grande do Norte, Brazil. Riv. di Malariologia, Anno X, N. 1, 3-11, 1931.
3. Kumm, Henry W.: Observations on Two Malaria Vectors and Distribution Records of Other Anopheles in the States of Bahia and Sergipe, Brazil. Ann. Trop. Med. Parasitol., **26**: 1, 1-6, 1932.
4. Root, Francis Metcalf: Studies on Brazilian Mosquitoes. I. The Anophelines of the *Nyssorhynchus* Group. Amer. Jour. Hyg., **6**:5, 684-717, 1926.
5. Townsend, C. H. T.: On *Nyssorhynchus tarsimaculatus* Goeldi and the Races of *Nyssorhynchus*. Rev. de Entomologia, **3**:1, 7-12, 1933.

DISCUSSION (*Abstract*)

Mr. W. H. W. Komp, U.S.P.H.S., Ancon, Canal Zone.—The late Nelson C. Davis, in an article on "Some South American Mosquitoes," in Annals of the Entomological Society of Washington (**26**:280, 1933), describes the mosquito:

"In Plate 3 are represented the head and anterior part of the thorax of an atypical *albitarsis* lava, together with a normal representative of the species. The anomalous condition is confined to the clypeal hairs, the *albitarsis* larva having its internal clypeal hairs rising close together, as in strodei larvae. The adult female bred from this larva appeared to be normal in all respects."

The locality from which the larva was obtained was Sao Salvador, Bahia, Brazil.

Davis's figure shows also a peculiar narrowing and elongation of the larval head, which he does not mention. In 1935, while in Colombia, at the headwaters of the Orinoco River, on the eastern slope of the Andes, I collected nine such larvae, from which I was fortunate enough to rear a male, as well as a series of females. This past September, while in Venezuela, in the delta of the Orinoco River, I found this form of *albitarsis* breeding in great numbers in shallow lakes, and in the same area took typical *albitarsis* larvae. I obtained males from each form, and the male terminalia are indistinguishable. So far as I know, we have only the typical form of *albitarsis* in the Canal Zone. Root's *albitarsis braziliensis* does not differ from the typical *albitarsis* larva in the clypeal hairs, as he says "the larval characters also agree with those of typical *albitarsis*, except that there seems to be a tendency for the outer anterior clypeal hairs to be a little shorter and with more lateral branches in variety braziliensis." (Studies on Brazilian Mosquitoes. I. The Anopheles of the Nyssorhynchus Group. Amer. Jour. Hyg., **6**:705, 1926.

Rozeboom's work, and my larval findings, open up the whole question of races in *albitarsis*. I have no doubt that other neotropical species, particularly *tarsimaculatus*, also split up into races or varieties, just as maculipennis does in Europe. A great deal more work is needed, particulary in South America, in order to determine, first, the presence of such races, and second, their relation to the transmission of malaria.

It may be well to point out some of the practical values of such work as Rozeboom's. Venezuela produces more petroleum than any other South American country. It has recently passed an antimalaria law, which, if enforced, will increase very materially the cost of medical services, which must by law be provided for their workmen by the foreign oil companies. We know that an Anopheline called "*albitarsis*" has been found infected in nature up to 5.8 per cent in Brazil. Do we know to what race or variety this *albitarsis* belongs? We do not. Does anyone know the biology, biting habits and infectibility of the race of "*albitarsis*" I found in Colombia and eastern Venezuela? No one does. If you were the medical director of an oil company in Venezuela, spending $40,000 a year for ditching alone, I think you would like to know.

THE LENGTH OF LIFE OF *ANOPHELES MACULIPENNIS*, VAR. *ATROPARVUS**

By ROLLA B. HILL, M.D.†
New York, New York

It is of much interest to know the length of life of anopheles under natural conditions. While it is obviously impossible to keep the insects under observation in nature, natural conditions can be approximated in the case of a peri-domestic species, and this is particularly true of over-wintering females.

In Western Spain, only the *atroparvus* variety of *Anopheles maculipennis* is found. It is the vector for the considerable amount of malaria that occurs in this region. This variety is probably the most domesticated anopheles of the western world. *Atroparvus* seeks man-made shelters by preference for its daytime resting place. It feeds largely upon domestic animals and man, and so far as we have been able to observe, feeds almost, if not exclusively, under shelter.

Fertilization of female *atroparvus* will take place in an enclosed space. We have frequently observed copulation upon the walls of our 15 centimeter cubical cages, as well as in our larger mosquito houses. Shute[5] (1936) has obtained fertilization in an ordinary test tube. A pre-nuptial flight is therefore not necessary, and may not even be the rule with this variety.

During the winter this variety seeks stables or other shelters, not houses, where it feeds at intervals. On warm sunny days it may make short flights. True hibernation therefore does not occur. However, eggs are not matured during the winter months. Development of the fat-body begins toward the end of September, with concomitant arrest of ovarian development until about the end of January. The first adult males emerge in mid-April. We have found, both in the laboratory and in the mosquito house that many over-wintering females will lay at least two batches of eggs in the spring. This has also been noted by Martini (1927), de Buck[1] (1936), and Shute (1936). The two latter authors were dealing with *atroparvus*.

In view of the claustral sexual habits, the feeding preferences and the winter shelter sought, we can come closer to imitating natural conditions for *atroparvus* than for less domestic anopheles; and for over-wintering females can closely approximate what seems to be their preferred habitat. This we have attempted to do in the following observations.

THE MOSQUITO HOUSE

Our anopheles were placed in an adobe brick house built according to the plan of the de Buens (1930). This house consists of one room approximately 3 meters long by 1.50 wide, and 3 meters high. Double screen doors are placed at one end, and near this is a large window aperture. Neither of these openings has any other protection than the screens. At the far end, a section is walled off to give protection to the rabbits, which provide the food supply, and to the anopheles. A box is provided for further shelter. The anopheles are further protected from air currents and cold by two partial divisions extending from both floor and ceiling, before the window is reached. In front of the window is a cement tank with water and aquatic plants for egg-laying.

OBSERVATIONS

On November 23, 1933, 80 female *atroparvus* were caught in a stable and placed in the mosquito house. The age of these anopheles was unknown. However, since egg-laying stops in September, larvae are rare in October and the last males die off in November, these anopheles were hatched in October or earlier. Hence they were at least a month old.

On December 1, 69 anopheles remained. The first eggs were seen on February 24, and larvae appeared March 10. Fourth-stage larvae appeared on April 15, at which time the tank was drained to prevent hatching. Fresh water was added on April 20, at which time 18 adults remained. Eggs were again found on April 23, and larvae emerged 3 days later.

By May 6, only 10 adults remained. The last one died on May 21.

Hence about one-fifth of the over-wintering females lived under observation for at least 5 months, and one

TABLE 1

METEOROLOGICAL DATA

	1933			
	November		December	
Temp. C°	2nd h.		1st h.	2nd h.
Ave. max.	12.7		9.6	9.0
Ave. min.	5.5		3.6	0.8
Rel. hum.				
8 a.m.	71		88	87
5 p.m.	65		79	79

	1934					
	January		February		March	
Temp. C°	1st h.	2nd h.	1st h.	2nd h.	1st h.	2nd h.
Ave. max.	11.2	11.6	13.1	16	13.8	14.6
Ave. min.	0.9	1.3	0.5	1.6	2.8	5.3
Rel. hum.						
8 a.m.	87	80	76	71	77	76
5 p.m.	72	68	58	47	59	63

	April		May		June	
Temp. C°	1st h.	2nd h.	1st h.	2nd h.	1st h.	2nd h.
Ave. max.	16.9	16.7	25.6	29.9	28.8	28
Ave. min.	7.5	7.2	11.7	13.3	14.3	14
Rel. hum.						
8 a.m.	83	80	63	63	55	53
5 p.m.	72	63	44	35	37	41

	July		August
Temp. C°	1st h.	2nd h.	1st h.
Ave. max.	33.6	36.7	37.8
Ave. min.	17.1	20.8	21.6
Rel. hum.			
8 a.m.	52	47	48
5 p.m.	25	25	28

*Read before National Malaria Committee (Conference on Malaria), meeting conjointly with Southern Medical Association, Thirtieth Annual Meeting, Baltimore, Maryland, November 17-20, 1936.

*The studies and observations here recorded were made with the aid and under the auspices of the International Health Division of the Rockefeller Foundation.

†International Health Division, Rockefeller Foundation.

female lived a minimum of 6 months. The true age of all was at least a month more.

Repeating the experiment the following year, 200 wild-caught females were released in the house on December 1. The results closely followed those given above. The last specimen died on May 15.

Anopheles which had passed the winter under absolutely natural conditions were then observed. On April 8, a batch of 80 over-wintering females was caught in a stable and transferred to another mosquito house. The last one died on May 1. These three sets of observations check fairly closely, and give a good idea of when the last of the old generations die off.

The long life of a fair proportion of the mosquito population during the winter, when the temperature is low and humidity high, and metabolism and activity are lessened, contrasts sharply with the length of life during the summer months.

On May 8, 150 females of the new generation were released in the mosquito house. The last one died on June 28, a period of 44 days. On June 30, 200 newly emerged anopheles were released; the last one died on August 6, or after 37 days. In both these cases there was a high initial mortality, after which the curve flattened out. The curve of remaining mosquitoes was, in fact, not unlike the familiar 1x curve.

While the cause of the high initial mortality is not known, and we are not even sure that this is a natural phenomenon, undoubtedly the high temperature, the very low humidity and increased activity including reproduction, are among the chief causes for the shorter life in summer.

For purposes of comparison, we give in the accompanying table the weather station average maximum and minimum temperatures, and the average humidity readings taken twice daily, for half-month periods. Continuous readings were recorded in the mosquito house, but since their inclusion here would unnecessarily burden this note, we have thought it better to include the official figures.

It will be noted that the average minimum temperature for any fortnight never reached 0° C.; the nights when this temperature was reached were infrequent. The absolute minimum was —2.5° C. The average maximum temperatures are fairly high. The sun shines almost daily throughout the winter, the atmosphere warms up and the anopheles feed or move about. During the summer both maximum and minimum temperatures are high and the relative humidity is extremely low. The average reading at 5 o'clock for all of July was 25 per cent. These factors naturally have a deleterious effect on the anopheles.

SUMMARY

Anopheles of the *atroparvus* variety of *A. maculipennis* can live for at least 6 months under approximately natural conditions. In the height of the summer the anopheles only live about 6 weeks. Temperature, activity and humidity are factors that obviously influence length of life.

BIBLIOGRAPHY

1. De Buck, Schoute; and Swellengrebel: Recherches sur l'anophelisme sans pauldisme aux environs d' Amsterdam. Riv. Malariologia. Anno VI. fasc. 1. 1927.
2. De Buck and Swellengrebel: Behavior of Dutch *Anopheles atroparvus* and *messeae* in Winter Under Artificial Conditions. Riv. Malariologia, **A. 13**:404-416, 1934.
3. De Buck and Swellengrebel: Seasonal Longevity of *A. maculipennis* in Holland with Reference to Their Ability to Act as Malaria Vectors. Proc. Roy. Acad. Sc., Amsterdam, **38**: 335-343.
4. De Buen, E.: Algunos datos sobre biologia del *A. maculipennis* en su fase *acuatica*. Med. Pais. Cal., **3**:331, 1930.
5. Shute, P. G.: A Study of Laboratory Bred *A. maculipennis* var. *atroparvus* with Special Reference to Egg-laying. Annals Trop. Med. & Parasit., **30**:11-16, 1937.
6. Swellengrebel, N. H.: Hibernation of *A. maculipennis*. Tydschr. v. Vergelkende Geneesk., C. **7**:302-303, 1927.
7. Swellengrebel, de Buck, Schoute and Kraan: Investigations on the Transmission of Malaria in Some Villages North of Amsterdam. Quart. Bull. H. O. L. of N., **5**:295-352, 1936.

THE MALARIA PROBLEM IN PORTUGAL*

By ROLLA B. HILL, M.D.†
New York, New York

Although malaria has long been known to be a problem in certain parts of Portugal, its real importance has only recently begun to be appreciated. In 1903, Dr. Ricardo Jorge, for many years General Director of Health in Portugal, outlined the general principles of a proposed malaria campaign. This was followed in 1906 by the only published survey made until recently. While the survey showed a wide distribution of malaria, practical difficulties prevented the organization of a malaria service at that time. A service was established in 1931, under the present Director of Health, Dr. Alberto de Faria. There are now four government malaria stations, one in each of the principal malarious zones.

In 1933 the Rockefeller Foundation assisted in a country-wide malaria survey, and in 1934 this organization established a malaria station in the center of the worst malaria region. The present report is based principally upon data collected during the survey and subsequently in the malaria station.

GENERAL DATA

Portugal is the most western country of Europe. It is part of the Iberian peninsula, and is situated between the thirty-seventh and forty-second parallels of latitude, and the sixth and ninth meridians of longitude. It is almost quadrangular in shape, with an extreme length of 560 km. and a width of 218 km. The total area is 89,560 sq. km. The population, according to the census of 1930, was 6,191,000.

The larger part of Portugal is of ancient origin, land of recent formation being almost entirely composed of alluvial soils in the river basins. It is in the latter that malaria is found.

The country is, in general, hilly and rolling. Four ancient mountain ranges, forming the western extremities of the transverse systems of the Iberian peninsula, run in a generally western direction, and increase the

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†International Health Division, Rockefeller Foundation.

rather rugged character of the country. The direction of the mountain ranges determines the direction of the main rivers. The most important of these, the Tagus, Douro, Guadiana and Minho, rise in Spain. Others of importance are the Mondego, the Sado and the Vouga. All three of the latter, together with the Tagus, are tidal for a considerable distance from their mouths.

The Sado, the Tagus and the Mondego valleys are the principal foci of malaria in the country.

The climate is mild. The winters are pleasant, freezing weather at night being rare in the malaria regions. The summers and winters are tempered by the ocean breezes. Rainfall averages 500 to 600 mm. in the malarious zones. Nevertheless, there are many springs and small streams in the alluvial plains, fed from the higher land, which give sufficient water for irrigation and rice cultivation.

ANOPHELES SPECIES AND VARIETIES

Our malaria survey of 1933 covered the entire country where there was a possibility of malaria's being found. Two hundred of the two hundred and seventy-two municipalities* were visited during the months of May and August inclusive. Over 11,000 children under 12 years of age were examined.

Collections of anopheles in adults and larvae were made at each locality visited. The adults were forwarded alive to the central laboratory, while the larvae were killed in formalin. The female anophelines were induced to lay eggs, the readiest and in some cases the only means of distinguishing between different varieties of *A. maculipennis*.

We have found only two species of anopheles: *Anopheles bifurcatus* and *Anopheles maculipennis*. *A. bifurcatus* is a rare, cold water, wild species, not concerned with malaria transmission in Portugal. Of the *A. maculipennis* we have found two varieties: var. *typicus;* var. *atroparvus*.

The former has a rather limited distribution in the northern and central portions of the country, is not found in large numbers, is largely an animal feeder, and as elsewhere in Europe is probably not concerned with malaria transmission.

The *atroparvus* variety is found all over Portugal, in regions with and without malaria. It is the only malaria carrier in Portugal and western Spain. The absence of malaria in many regions where *atroparvus* occurs may be attributed to a number of factors, but we believe it is principally due to the fact that *atroparvus* is a carrier largely in proportion to its density. This variety has no special preference for human blood. Although it is a peri-domestic mosquito, it apparently chooses whatever blood supply is closest at hand. If the anophelines are few, the domestic animals, being usually more accessible, will be the principal victims. If anopheline production is great, proportionately more humans will be bitten. Under these conditions, malaria transmission will occur. It should be noted that *atroparvus* in this region bites almost, if not exclusively, under cover.

In spite of the fact that the most malarious regions of Portugal are at or near tide water level, *atroparvus* is locally a fresh water breeder. In the rice fields, where the most extensive breeding occurs, the total chloride content is usually less than 100 mg. per liter in spite of rapid evaporation and presumable concentration of solids. On a few occasions we have found larvae in water with a total chloride content as high as 400 mg. per liter, and once with 700 mg. per liter, but this is exceptional. Brackish water by definition contains more than 1,000 mg. per liter.

These facts are of interest and importance because elsewhere in Europe, except in western Spain, *atroparvus* breeds in brackish water; and except in Holland, where conditions of malaria transmission are unusual, this variety is considered to be relatively innocuous.

But there are areas in Portugal where the malaria is about as intense as anywhere else in Europe.

MALARIA PREVALENCE

Partly on account of the scarcity of doctors in rural areas, the statistics on malaria mortality are neither complete nor reliable. Malaria occurs in river valleys, largely near their mouths, where rice is grown. There are 50,000 acres in rice. Breeding occurs largely in rice fields. Most of the reported mortality occurs in the districts of Setubal ans Beja (Sado river), Santarem (Tagus river), Evora (Sado and Guadiana), Coimbra (Mondego), and Braganca (Douro). Malaria is not a reportable disease in Portugal.

Our malaria survey, which showed that malaria occurs mainly in these districts, narrowed the problem further to certain regions in these areas. Practically all the high indices were found in towns and villages where rice is the principal crop. A small amount of epidemic malaria occurs in the southern and eastern sections where rice is not grown, but where sluggish streams produce *atroparvus* in relative abundance. A certain amount of malaria is also found in a restricted area along the Guadiana River, which ceases flowing in summer. The only important malaria center without rice is found along the Douro River and its tributaries. Here the streams dry up to form large summer pools, and a very considerable amount of malaria occurs.

The Sado River basin is undoubtedly the chief focus in the country. In our survey we found the village of Palma recovering from an epidemic. A parasite rate of 23 per cent and a spleen rate of 95 per cent showed its extent. In subsequent semi-annual examinations the spleen rate has been sustained at between 50 and 60 per cent.

In Aguas de Moura, where we established our malaria station in 1934, the spleen and parasite indices in our 1933 survey were 34 and 42 per cent, respectively. They have risen at each successive examination. In 1934, 50 per cent of the population of Aguas de Moura was treated in our dispensary after microscopic examination showed parasites in the blood. In 1935 this percentage was raised to 68. Of the 334 dispensary positives in 1935, 21 per cent showed *Plasmodium vivax*, 8 per cent *P. malariae*, and 45 per cent *P. falciparum* infections, with a further 20 per cent diagnosed as small rings and probably also largely *falciparum*. It is probable that 1936 will show a further increase in the total population infected, while the proportion of *falciparum* infections has risen still higher.

In 1935 seven of the 13 children born during the year,

*The 272 municipalities are grouped into 18 political districts. A municipality covers a varying amount of territory and usually includes several towns or villages. The population varies from 3,000 to 75,000, except for Lisbon and Porto which have over 500,000 each.

including those born after the malaria season, had malaria. In 1936, up to the end of September, all children under 1 year of age had been treated for malaria.

Similar conditions prevail in Landeira, a neighboring village. In 1934, 82 per cent of the total population walked three miles to the dispensary and were found positive for parasites, as well as clinically. In 1935, 78 per cent were again attacked. The figures for 1936 are not yet available, but it appears probable that there will be a small reduction in the total number treated.

In Alcacer do Sal, a town of 5,000 inhabitants, the spleen and parasite rates in our survey were 33 and 13 per cent, respectively. This town suffers from periodic devastating epidemics superimposed on the endemic malaria. Rice is grown around all these towns, and anophelines are very abundant.

Along the Tagus River and its tributaries is a large rice-growing region which is being extended yearly. Here the spleen indices in 1933 ranged as high as 42 per cent. In the Mondego Valley, in which rice is even more extensively grown, the highest spleen rate found was 55 per cent.

Without going further into details, we may say that malaria is a public health problem in five regions, and an especially important one in three of these. The five regions lie in the hydrographic basins of the principal rivers, the Sado, Mondego, Tagus, Guadiana and Minho Rivers, and are restricted in extent. In the first three the malarious areas are found where a large amount of rice is grown. The other two present special problems, where the amount of malaria is less and is even more restricted.

Anopheles are found throughout Portugal, and a small amount of epidemic or sporadic malaria occurs in a number of villages, especially in the central-southern parts of the country, where the amount of water is enough to produce anophelines in sufficient numbers. But here in general we found low spleen and parasite rates even during the malaria season. Malaria does not constitute a real problem in these regions.

RICE CULTIVATION

In many parts of the world rice culture is not dangerous from the standpoint of malaria. Thus in the great Milan region of Italy, where most of the Italian rice is grown, and which Hackett has said produces an unrivaled crop of anophelines, malaria is now practically unknown. In the Valencia region of Spain, with its vast rice fields and huge anopheline population, malaria has also disappeared. In both these regions, *subalpinus* is the predominant variety of *maculipennis*. *Atroparvus* is not known to be present.

In the delta of the Vouga River in Portugal, only 50 km. north of the Mondego rice and malaria region, a very considerable amount of rice is grown, and swampy land and water are abundant. Here *atroparvus* is found in large numbers in stables and other appropriate shelters, mixed with the *typicus* variety. Malaria was present as late as 1906, but is now practically absent. Nevertheless, rice growing is definitely harmful in many other regions, including certain ones in Portugal.

After ploughing, leveling and walling off the land into conveniently sized plots, the rice is either sowed broadcast in March after flooding the plats or is first planted in seed beds and transplanted late in May. Rice needs heat as well as moisture, and the usual practice is to flood the land to a depth of 10 to 15 cm. and then keep the water flowing on at a rate which will allow a small run-off.

The rice fields are weeded, necessarily by hand, usually twice during the growing season, the last weeding occurring in July. Harvest occurs late in September. A good yield is around 7,000 kilos per hectare. Yield depends upon the character of the soil, the amount and kind of fertilizer used, and many other factors. Rice is one of the most exhausting of crops. Even with artificial fertilizer it is customary in Portugal to grow rice for three to four years and then plant the land with other crops for a similar period. The amount of water is also limited in some cases.

The agriculturist is chiefly interested in three things: yield; cost of production, which includes fertilizer, weeding and other labor; and in some cases the amount of water used. Any scheme for control of anopheline breeding in the rice fields must take these things into account.

ITINERANT LABOR

There are three seasons when a large amount of work must be done rapidly: during planting, weeding and harvesting. The work being seasonal, local labor is not sufficient and large numbers of laborers are imported. The people come mostly from non-malarious regions. Men, women and children are employed, so that whole families and even whole villages will migrate for work. The climate is mild, and these groups encamp near the rice fields under rude shelters erected by themselves. In some cases barracks are available, but this, we believe, only increases the chances of malaria infection under present conditions.

Most of the people soon acquire malaria. This probably has an immediate effect upon the malaria transmission rate of the near-by villages and undoubtedly has some influence in spreading and maintaining the small amount of malaria that occurs outside the rice areas. The physical and economic results are disastrous for the patient, and the employer loses both in labor and efficiency.

CONTROL OF MALARIA IN THE RICE REGIONS

Malaria control in rice-growing areas might be brought about by one or a combination of several means.

(1) The suppression of rice cultivation.

(2) Animal deviation of existing anophelines over a long period of time, or the supplanting of existing varieties by non-dangerous varieties or species.

(3) Protection of floating labor and stable population from anophelines by the use of screens.

(4) Treatment of rice fields with larvicides.

(5) The development of precocious varieties of rice which can be planted later and which ripen sooner, thus shortening the time of rice field flooding.

(6) Improvement in agricultural methods which, while improving rice yield, tend to lessen anopheline production.

(7) Intermittent irrigation with periodical drying of rice plats to prevent anopheline production.

(1) Although the rice production in Portugal has increased greatly within recent years, the amount is not sufficient for local needs. Rice is a necessary and a profitable crop, and total prohibition of its cultivation is undesirable and impossible.

Nevertheless, rice growing should be allowed only on government license. This license should be given

only for lands at a certain distance from the towns, with sufficient water and adequate drainage, and with proper provision for the housing of labor. It is estimated that with improved methods of cultivation the lands at present in use would produce enough rice for local needs. An extension of rice lands would therefore seem unnecessary.

(2) A gradual change in the anopheline fauna, or the habits of existing species, seems to be the cause of the disappearance of malaria from certain regions. But up to the present time, no one has succeeded in voluntarily supplanting an existing species with a harmless variety in rice regions. We have, of course, the classic examples described by Watson in Malaya, which gives us hope that this may some time be possible, when we know more about the habits of the Portugal varieties.

(3) Protection of the human population is possible. This method takes time, but it is one which should not be neglected. As long ago as 1902 Grassi was advocating the use of screens, but only within the last few years has their use become general for malaria protection in the reclaimed lands around Rome.

The work of Coogle, of Boyd, Riley and of a great many county health officers throughout the southern United States shows what can be done by persistent, well directed campaigns.

In Portugal a start has been made on house screening, with encouraging results. In addition, employers should be compelled to provide screened barracks for their imported laborers. It seems probable that this will soon be obligatory.

(4) The use of larvicides in rice fields is difficult and expensive. When one has to cover from 500 to 1,000 acres per week in plats 50 yards or more wide with a luxuriant emergent vegetation that makes reaching the water surface difficult, the use of any of the common larvicides is almost out of the question. Oil cannot be used. Paris green is employed in India. It has been tried in Portugal; but its cost is exceedingly high, and the results are of doubtful value. During flowering, if the arsenic reaches the open blossom, the plant is burned and the crop damaged (Covell, 1935).

In the Aguas de Moura area, the population is less than 1,000 and some 400 hectares are devoted to rice. According to Missiroli, about 10 grams of pure Paris green is needed per 100 square meters, or 1 kilogram per hectare. Thus 400 kilos would be needed for dusting all the rice fields once. If one dusts fifteen times during the season, a total of 6,000 kilos would be used, to say nothing of the provision of diluent, labor and apparatus. In Portugal, Paris green costs approximately $1.00 per kilo. The per capita cost of protecting 1,000 people would therefore be well over $7.00. This is manifestly too much to spend for this type of work.

While we are working on other larvicides, we do not at present see that this method is locally feasible.

(5) The development of earlier and better varieties of rice is in the domain of the agronomists. Suffice it to say that precocious varieties are now known and are used in special circumstances, but so far an earlier yield is obtained at the expense of quantity.

(6) Agricultural improvements can certainly be made. In Portugal, the government agronomists are making every effort to popularize the transplanting of rice instead of direct seeding. The process is somewhat more expensive, but the increased yield and other advantages more than repay the additional expense. This again is the special field of the agricultural experts, who are aware of the importance of the problem.

(7) The periodical drying of rice plats, or intermittent irrigation, seems to offer the best possibilities under present conditions for control of rice field anopheline breeding. Manson-Bahr states that in Java the drying of the fields one day per week has been made compulsory and is efficacious without apparently damaging the growth of rice. In many places in Portugal, rice men are accustomed to a temporary failure of water. They state that the rice suffers no harm if without water for as long as ten days.

For the past two years we have tried intermittent irrigation on a fairly large experimental scale, with encouraging results. After flooding for ten days, the water is turned off for four to eight days while the fields drain and dry to the consistency of, for example, putty. An absolutely dry surface is not necessary to kill the larvae.

Anopheles production is absolutely controlled, which is what interests us. On the agricultural side, the growing rice seems to benefit from a lessened quantity of undesirable algae, and of weeds, and the yield is greater. This increase, in our plots, has been sufficient to awaken the interest of some of our more progressive proprietors and of the government agronomists.

We hope, therefore, that with the mechanical protection of the floating labor, the transplantation of rice and other improved agricultural methods, plus the introduction of intermittent irrigation in regions where this is a practical procedure, in addition to other methods which may develop, we may some time be able to work out a practicable means of malaria control in Portugal.

SUMMARY

Malaria is a serious problem in the alluvial plains of three of the principal rivers, where rice is extensively grown. Smaller malarious zones are found in the valleys of two other rivers, where a sufficient number of anophelines is produced to maintain the disease. In the rest of the country, the amount of malaria is not sufficient to constitute a public health problem.

The *atroparvus* variety of *A. maculipennis* is the sole carrier of malaria in Portugal. This variety is also found in non-malarious zones, and is, apparently, a vector largely in proportion to the anopheles density.

Malaria control is intimately connected with rice field anopheles breeding. Various possible methods are discussed. It is concluded that screening of itinerant labor barracks and improvements in agricultural methods are necessary, while under present conditions intermittent irrigation of the rice fields, successful experimentally, is the most promising method of antilarval control.

BIBLIOGRAPHY

Covell, G.: The Effect of Paris Green Dusting on Rice Crops. Records Malaria Survey of India, **5**:153-157, 1935.

Hackett, L. W.: Biological Factors in Malaria Control. Amer Jour. Trop. Med., **16**:341-352, 1936.

Jorge, R.: Sobre o estudo e o combate do sezonismo em Portugal. Bull. Department of Health, Tomo I.

Jorge, R.; and Morais, Sarmento: La malaria en Portugal. Bull. Department of Health, Tomo III, 1906.

Landeiro, F.; and Cambournac, F., under the direction of R. B. Hill: O sezonismo em Portugal. Ministry for the Colonies, Pub. No. 28, 144 pages, 1935.

Manson-Bahr, P.: Manson's Tropical Diseases, 10th Ed., London, 1935.

Swellengrebel; Kraan, de Buck; and Van der Torren: Occurrence in Fresh and Brackish Water of the Larvae of "*A. maculipennis atroparvus*" and "*messeae*" in Some Coastal Provinces of the Netherlands. Quart. Bull. Health Organ., **5**:280-294 (June) 1936.

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M. Y. DABNEY, M.D., Editor
EUGENIA B. DABNEY, M.S., Associate Editor
C. P. LORANZ, Secretary, Treasurer and General Manager

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EDITORIAL DEPARTMENT

SOUTHERN MEDICAL ASSOCIATION
Thirty-First Annual Meeting
New Orleans, Louisiana, November 30-December 1-2-3, 1937

THE NEW ORLEANS MEETING

The convention this year will be held two weeks later than usual, during the week following instead of the week before Thanksgiving. The Southern Medical Association will open its meeting on the last day of November, on the thirtieth, to continue through December third. Previous meetings for many years have been held during the week before Thanksgiving. The reason for delaying the time for two weeks is that the weather is usually better in New Orleans after Thanksgiving.

Official activities will begin on Tuesday, November 30, with a program conducted exclusively by the New Orleans profession. Tuesday will be New Orleans Day, with four general clinical sessions in the forenoon, two surgical and two medical; and five in the afternoon, two surgical, two medical and one on ophthalmology and otolaryngology. This largest Southern city is a leading medical center by virtue of its great hospitals, its two distinguished medical schools, and its outstanding profession, and New Orleans Day will provide many stimulating discussions.

Two clinical sessions, one medical and one surgical, will be conducted by visiting physicians on Wednesday morning, and a few section meetings will be held at that time. The majority of the section meetings will begin Wednesday afternoon to continue through Friday morning. Two new sections, a Section on Proctology and a Section on Anesthesia, making eighteen in all, have been added this year. All activities will be housed under one roof, the impressive New Orleans Municipal Auditorium.

Scientific and technical exhibits will be large in number, and both interesting and instructive. Physicians who have something to offer for the scientific exhibits should write to the Association office in Birmingham for space at the earliest possible date.

The making of hotel reservations should not be delayed longer. The Hotel Committee, of which Dr. M. T. Van Studdiford, 912 Pere Marquette Building, New Orleans, is Chairman, will find accommodations for all who wish to attend. However, never before has there been so large a hotel reservation so far in advance of a meeting as there has been this year. The headquarters hotel has been booked to capacity for several months and the other hotels are rapidly filling up.

Those who are interested in athletics and who can take a short vacation before the meeting may plan to attend the Tulane-Louisiana State University football game on Saturday, November 27, three days before the meeting. This game is one of the Southern classics.

A number of members have asked the Association office to arrange for a trip to the Tropics in connection with the New Orleans meeting, and the matter is receiving consideration. Whether there is an official trip or not, very delightful private expeditions may be conveniently planned from this port. The several steamship lines out of New Orleans offer many pleasant possibilities.

CHILDBEARING AFTER THE AGE OF THIRTY-FIVE

Despite the publicity given child marriages, the average age of women at marriage is probably greater for this generation of Americans than it has ever been before. This may be taken as evidence of increasing prosperity of the nation and rise of the standards of living, since the child marriages reported are frequently the result of extreme poverty. The female child may be driven to marriage by starvation.

Added to the tendency of the generation to

marry later, there is an increasing tendency to postpone childbearing, which further raises the age of primiparity. First childbearing is believed to be physiologically much easier for women between 20 and 30 than for older women, and first pregnancy after 35 is often viewed with a degree of uneasiness in lay and professional circles. The childless woman of 35 is a fairly common patient in gynecologic practice. She comes to ask whether she should permit herself to become pregnant if she has purposely delayed it or has married late, or she comes to seek professional aid if her marriage has been barren. Her chances for a successful gestation should be carefully weighed.

Roeder,[1] of Philadelphia, has attempted to do this by analysis of hospital records of 113 women who bore the first child after the age of 35. They were taken from a group of more than 13,000 patients delivered in the Philadelphia Lying-in Hospital in a six and a half year period. They constituted less than 1 per cent of the deliveries in the hospital during that time. The usual obstetrician in a lifetime, at this rate, would not encounter many such cases. The majority of the Philadelphia series were white private patients, which suggests a better economic status of the middle-aged primiparas.

In the group of older women, Roeder noted that complications were more frequent in labor, pregnancy, and the puerperium. The incidence of operative delivery was higher. Cesarean section was done five to six times as frequently as in the general series. Elective section was performed in 28 cases or one-fourth the series of middle-aged patients. It is questionable whether the incidence of operation should be counted as an index of the condition of the women or how much it should be weighted for the prevailing belief that unusual measures are justified in delivery of these cases. There were two maternal deaths, one from cardiac failure and one from postoperative peritonitits, making a maternal mortality slightly higher than in the general series. The incidence of operative delivery was 92 per cent.

Fetal mortality was not greatly different in the two groups. Ten fetal deaths were reported in the series of older women. Four fetuses were stillborn; four were premature, and one deformed. The incidence of malformation in primiparity after 35 is not greatly different from the figures given by Murphy[1] for deformity in the general population. Murphy has shown that offspring of older women are much more liable to congenital defects than are those of young women. The deformities noted by him, however, usually occurred in children of the fifth or a subsequent pregnancy, rather than in first babies. Liability to malformation in the families studied by him increased both with the age of the mother and the number of the pregnancy, and it would appear that the defects enumerated were the result of maternal exhaustion from childbearing, rather than of the age of the mother itself.

These modern hospital statistics thus bear out the impression that complications of pregnancy are more frequent in primiparas of 35 or older than in a general group of deliveries of all ages. An overwhelming majority of the women who bore their first child in the late period had a successful termination. Morbidity and mortality statistics are possibly more favorable for primigravida of this age than for women of 35 who have borne five or six children.

1. Roeder, P. H.: A. Statistical Analysis of Records of Primigravidas Over Thirty-Five Years of Age. Amer. Jour. Obst. & Gyn., **33**:91 (Jan.) 1937.

DIETARY CATARACTS

Eye defects are so common in experimental dietary deficiencies that the ophthalmologist must derive increasing profit from studies of nutrition. A number of different types of ocular cataract may be produced by defective rations. There is a vitamin G deficiency cataract. Cataractous changes are reported to occur in the eyes of all rats to which galactose (milk sugar) is given as a chief source of carbohydrate.[2] Reduction of the quantity of protein hastens the development of the galactose cataracts.[3] Clinical cataract has been several times reported subsequent to medication with dinitrophenol, the drug which is believed to act like thyroxin in hastening metabolism.

A recent difficult and interesting analysis of the effects of sodium deprivation is that of McCollum[4] and a group of coworkers at the Johns Hopkins University. Sodium is so common a constituent of most foods that only very expert

1. Murphy, Douglas P.: Congenital Malformation: A Study of More than 500 Families Each Having at Least One Congenitally Malformed Child. Sou. Med. Jour., **29**:79, 1936.

2. Mitchell, H. S.: Cataract in Rats Fed on Galactose. Proc. Soc. Exper. Biol. & Med., **32**:971, 1935.

3. Mitchell, H. S.; and Cook, G. M.: Influence of Protein or Cysteine Intake on Cataract-Producing Action of Galactose. Ibid. **36**:806 (June) 1937.

4. Orent-Keiles, Elsa; Robinson, Aaron; and McCollum, E. V.: Effects of Sodium Deprivation on the Animal Organism. Amer. Jour. Physiol., **119**:651 (July 1) 1937.

chemists could prepare a ration free from sodium which would still provide an adequate amount of other essential food elements. The rats of their investigation were placed on a sodium deficient ration immediately after weaning. They grew normally for a few weeks, then began to lose weight. Bluish grey corneae were noted, with thickening and ulceration, loss of hair about the eyes, and other ocular complications, including capsular cataract. The animals had signs of disabling disease in many tissues and there was a one hundred per cent mortality in four to five months. If the animals were deprived of both sodium and chlorine, symptoms were less severe than on the ration deficient in sodium alone. On the sodium-chloride deficient diet the eyes remained normal for three months.

SUPRARENAL DISEASE

Interdependence of the endocrines[1] is confusing to diagnosis, but keeps alive the hope of treating a glandular deficiency with the extract of another gland. Experimentally, goiter may be produced by injection of a certain anterior pituitary extract and diabetes by another, the thyroid being presumably stimulated in the one case and the pancreas inhibited in another by the two pituitary preparations. An adrenal stimulating hormone of the pituitary has also been described. A suprarenal cortical tumor may stimulate the human gonads and induce precocious sexual maturity. Frank[2] reported two cases of human cortical tumor in both of which there was a great increase of urinary excretion of follicular hormone, which stopped on removal of the adrenal tumors. Other abnormal sex hormones have been detected in the urine of patients with adrenal tumor.[3] All of this of course indicates a dependency of the ovaries upon the adrenals. The dependence of the ovaries upon the anterior pituitary has been established; and vice versa, the dependence of the anterior pituitary upon the ovaries since the pituitary changes histologically with the ovarian cycle and with castration. During pregnancy, there is a great increase of anterior pituitary-like hormone in the urine; in hydatid mole and chorionepithelioma, which are pathologic conditions of the uterus, the same hormone is excreted in much greater quantities than in pregnancy. Here again is suggestive evidence of stimulation of ovaries or pituitary by the uterus.

The various changes are confusing to the clinician who is trying to discover and treat the primary disease. He is greatly aided by development of a simple blood or urinary chemical test for a hormone effect. In normal individuals, insulin causes a prompt drop of blood sugar; parathyroid extract causes an immediate rise of the blood calcium. The various adrenal cortical extracts are usually standardized by determining their ability to keep adrenalectomized animals alive over a considerable period. The effects of the various suprarenal cortical preparations on the market are reported as uncertain, and their potency is frequently questioned. Harrop and Thorn[1] report that this hormone has a constant effect upon urinary salts if it is injected into normal dogs; the urinary sodium excretion is decreased and the potassium increased. They suggest this as a suitable test for assay of the extracts.

If confirmed, it should prove most useful for standardization. Conversely, of course, one would consider the possibility of a clinical test for hypo and hyper-adrenal-corticism, by estimation of the patient's urinary potassium and sodium excretion on a measured ration. This might provide a reliable basis for diagnosis.

1. Lukens, F. D.; Flippen, H. F.; and Thigpen, E. M.: Adrenal Cortical Adenoma with Absence of the Opposite Adrenal. Report of a Case with Operation and Autopsy. Amer. Jour. Med. Sci., **193**:812 (June) 1937.

2. Cahill, G. F.; Loeb, R. F.; Kurzrok, R.; Stout, A. P.; and Smith, F. M.: Adrenal Cortical Tumors. Surg., Gyn. & Obst., **62**:287, 1936.

3. Butler, G. C.; and Marrian, G. F.: Isolation of Pregnane 3, 17, 20-triol from the Urine of Women Showing the Adrenogenital Syndrome. Jour. Biol. Chem., **119**:473 (July) 1937.

TWENTY-FIVE YEARS AGO

From Journals of 1912

American and European Medical Schools.[2]—"American physicians go to Europe in order to perfect themselves in the different branches of medical science; few European physicians come to America for the same purpose. European business men, however, come to America to investigate American business organization; few Americans go to Europe for that purpose. Is it only a fad on the part of the American physician to go to Europe, and of the European business man to come to America, or is it acknowledging that medical science is more advanced in Europe than in this country, as business methods are in America than in Europe? If we examine where American physicians go we shall find the reasons why they are attracted there, and find the way to keep them home and perhaps have European physicians come to us. * * *

"Medical schools should not be private enterprises, but be owned and maintained by the government; * * *

1. Harrop, G. A.; and Thorn, G. W.: Studies on the Suprarenal Cortex. Effect of Suprarenal Cortical Hormone on the Electrolyte Excretion of the Intact Normal Dog. Proposed Method of Assay. Jour. Exper. Med., **65**:757 (June) 1937.

2. Soresi, A. L.: American and European Medical Schools. N. Y. Med. Jour., **96**:17, 1912.

The government should organize and pay for the maintenance of medical schools, just as now, without thinking of violating any one's liberty, it organizes and pays for the maintenance of the army and navy, which have to defend the country from its enemies. * * * "

A Report on Uncinariasis.[1]—"The sanitary survey of this country shows a heavy infection in North Carolina, Georgia, South Carolina, Louisiana, Mississippi, Tennessee, Alabama, Virginia, Arkansas, and a light infection in Texas, Kentucky, Florida, California, Nevada, West Virginia, Oklahoma, and probably in Maryland. * * *

"The survey of foreign countries is very complete. It shows that hookworm infection belts the globe in a zone sixty-six degrees wide, with the equator near its center. Practically every country in this belt is infected, and it is estimated that 940,000,000 people live in districts where the disease is prevalent. The most heavily infected countries are India, where 60 to 80 per cent of the population of 300,000,000 are infected; the Guianas; Egypt; Natal; Ceylon; and the Malay States."

Synthetic Rubber.[2]—"The *Lancet* for June 22, 1912, in discussing the alleged discovery or invention of a substitute for rubber, points out that rubber is chemically a polymer of $C_{10}H_{16}$, and that isoprene, a light hydrocarbon oil, is obtained by the destructive distillation of rubber, but clearly must be obtained otherwise if it is itself to be the source of an economical production of synthetic rubber. The most economical source seems to be amyl alcohol or fusel oil, itself obtained by a special fermentation of sugar made from starch. It is probable, concludes the *Lancet,* that what is actually being recorded is a synthetic triumph of the greatest moment to the world, for it is not a rubber substitute that has been made, but rubber itself."

1. Editorials. N. Y. Med. Jour., **96**:31, 1912.
2. Editorial. N. Y. Med. Jour., **96**:33, 1912.

New Orleans—Where We Meet

MODERN NEW ORLEANS*

Two cities in one is New Orleans, combination of the new and the old, with the romance and glamour of old France and Spain merging with the hustle and bustle of progressive America.

On one side of Canal Street, widest and most beautiful business thoroughfare in the world, is the Vieux Carré, preserved practically as it was two hundred years ago. On the other is the business and financial section, a youthful enterprise compared with the age of the old city, yet already established in the industrial markets as one of the world's great ports.

There is nothing incongruous about it to New Orleanians, who know the story of how a great and progressive city grew from a small settlement in the marshes. Part of New Orleans' development into a modern city goes back into history. But in recent years, inhabitants have seen almost 8 miles of wharves and steel and concrete transit sheds constructed along the shores of the Mississippi; have watched giant planes fly into an airport constructed where only ducks flew before; have seen a swampy lakeshore reclaimed into several thousand acres of fine residential land; have crossed a majestic bridge over the Mississippi where many engineers said no bridge could be built; and have seen the mighty river, at flood stage, subside at the opening of a new man-made flood project. For all forms of development have taken place as New Orleans grew from a small, antique community of half a hundred Frenchmen to the modern Crescent City of half a million Americans.

In the South, New Orleans is the largest city, and leading wholesale, retail, industrial and financial center. For the United States, she is the fourth largest city in area and second port in value of foreign commerce. For the world, she is gateway to the products of the earth's richest agricultural area, the valley of the Mississippi and its tributaries.

From the economic viewpoint, New Orleans occupies an advantageous position in its location on the Mississippi River, only 107 miles from the Gulf of Mexico. At the heart of the city, the river is deep enough and wide enough to float the greatest of ships, which means that the ports of the world are within easy reach. Thirteen thousand miles of inland waterways terminate there, and make it the country's Grand Central Station for river steamboat and barge lines. Railways, motor transports and air lines complete the picture to give New Orleans distribution facilities unmatched elsewhere.

Combine these advantages with the fact that foreign raw materials enter the country at New Orleans; that around the city there is a natural storehouse of resources such as oil, sulphur and salt; and that a moderate year-round climate makes uniform, uninterrupted plant operation possible, and you have the reason why visitors will find New Orleans a thriving industrial city. More than 1,000 plants are in operation, producing considerable wealth in all forms. In foods, New Orleans offers sugar, coffee and rice. In agriculture, cotton, sugar cane and rice are the principal materials, and New Orleans produces 80 per cent of the wash suits made in this country. Besides which the city produces most of the modern and period furniture for the South, is a leader in production of industrial alcohol, furnishes the world with wallboard from sugar cane bagasse, and is the home of the cotton seed products industry.

But New Orleans' greatness is as well expressed by the monuments which she has built to progress as it is by industrial preëminence. Canal Street, which now runs where there once was a deep drainage canal, is not only the most beautiful, but one of the best lighted business streets in the world. An efficient White-Way lighting system makes the nights bright as day, and illuminates the neutral ground and sidewalks, which are paved with terrazzo marble.

Shushan Airport on Lake Pontchartrain, built up from a morass by pumping the lake bottom in behind a concrete seawall, is only five miles from the business district, and forms part of the new $40,000,000 New Orleans front yard being constructed along a five-mile seawall, which is followed most of the way by a concrete roadway. At the far end of this road is the Airport, pronounced by experts the most beautiful and efficient in the country. Landing accommodations and all other facilities are available at the field. Several national plane lines have terminals there.

A dream of decades became a reality in December, 1935, when the $13,000,000 toll-free Mississippi River bridge was dedicated, a direct outlet to the west for rail, highway and pedestrian traffic. Such a bridge

*Prepared for the SOUTHERN MEDICAL JOURNAL by the Publicity Department of the New Orleans Association of Commerce.

Shushan Airport

was for a long time believed impossible because of the difficulties entailed in finding foundation, but the central pier finally found solid bottom 170 feet below Gulf level. Its total height, to the top of the superstructure, is 409 feet, equal to that of a 36-story building. From 200 to 1,000 men worked on the construction over a period of three years, finally completing the 4.4 mile structure.

Probably the most important of the recent projects is the monumental Bonnet Carré Spillway, which offers further security for the city from the floodwaters of the Mississippi. Although the levees of the city have not been topped for 100 years, the spillway means added protection, for, situated 35 miles above the city, it removes the flood crests before they become dangerous. By opening the spillway, the high waters are diverted through a shallow basin into Lake Pontchartrain, thence out into the Gulf. The spillway was opened for the first time in February, 1937, and proved its efficiency by lowering the river level at New Orleans several feet. At full capacity it can handle more water than flows over Niagara Falls.

More ambitious plans have been laid for the future, too, with construction under way on the new $12,500,000 Charity Hospital, and plans now being perfected for a new $2,200,000 Federal building. A new City Hall is also proposed in the near future, and the Old French Market is being reconstructed and renewed in the original architectural style.

Book Reviews

The Thyroid and Its Diseases. By J. H. Means, M.D., Jackson Professor of Clinical Medicine, Harvard University, and Chief of the Medical Services, Massachusetts General Hospital. 602 pages, illustrated. Philadelphia: J. B. Lippincott Company, 1937.

The writer of this book has studied for almost 25 years the clinical and metabolic aspects of disturbances of the thyroid gland. This wide experience has been embodied in a piquantly written discussion of these disorders. Beginning with a description of the gland itself and of its hormone there follows consideration of the relation of the thyroid to other endocrines. Simple goiter, the various types of myxedema, toxic goiter, nodular goiter, thyroid malignancy and less common disorders of the gland are then discussed. The final section of the book deals with the therapeutic administration of thyroid substance and with the question of thyroidectomy for non-thyroid disease. The last chapter summarizes the more important conclusions from the preceding ones, dealing especially with a discussion of the mechanism of Graves' disease.

Emphasis in the book is placed both upon practical aspects of the subject and upon attempts to interpret the nature of the underlying processes in terms of chemistry and physiology. The author does not believe in the "dual-product" theory of thyroid secretion. He thinks that differences in the clinical picture are to be accounted for not by variations in the character of the substance secreted, but by differences in the constitutional make-up of those individuals who happen to acquire the disease. The volume contains a summary of most of the important work which has been done in this field. It is simply written and complex concepts are clarified by diagrams. The book will be valuable for anyone who wishes to have available a comprehensive treatise on this subject.

The Practice of Medicine. By Jonathan Cambpell Meakins, M.D., LL.D., Professor of Medicine and Director of the Department of Medicine, McGill University; Physician-in-Chief, Royal Victoria Hospital, Montreal; formerly Professor of Therapeutics and Clinical Medicine, University of Edinburgh. 1343 pages, illustrated. St. Louis: The C. V. Mosby Company, 1936. Price, $10.00.

The author of this book has attempted the difficult task of writing a comprehensive treatise on internal medicine. The changing character of modern medical practice is well illustrated by the fact that the infectious diseases, which occupy the place of first importance in books of medical practice written fifty years ago, are now relegated to a secondary position, the chronic diseases of the lungs, heart, gastro-intestinal tract and other organs being considered at greater length.

When one considers the great breadth of the subject of medical practice and the rapid advances which have taken place in all fields of internal medicine during the present century, and when one realizes that no one individual can really speak with authority over the whole range of this broad field, it must be admitted that the author has done a remarkably good job. The book contains numerous diagrams and is very comprehensive. However, so many conditions have to be discussed that relatively little space can be devoted to any one. For a medical student or a busy practitioner it can be recommended. The internist will occasionally desire to use it for reference, but will find relatively no new information in it and will naturally prefer to rely more upon books which are narrow in scope and treat one special field in more detail. One cannot help admiring the courage of the author in undertaking so difficult a task, and praise his persistence in having produced a good volume.

The Cardiac Glycosides. By Professor Arthur Stoll, D.Sc., M.D. 80 pages, illustrated. London: The Pharmaceutical Press, 1937.

Although digitalis has probably been the subject of more research than any other drug, and although the clinical researches of recent years have furnished clear

information as to the mechanism of its action and as to the conditions under which it is indicated or contraindicated, it is only recently that organic chemists have developed adequate methods for the separation of the numerous active principles which this drug contains. This book furnishes a summary of the recent chemical studies in this field. It does not deal with the practical aspects of digitalis therapy, but only with the studies on the chemical composition of digitalis bodies. It should be of interest to pharmacologists and to all organic chemists who are working in the difficult field of the more complex carbohydrate derivatives. Although the results of such researches may be of great importance for clinical medicine, the practicing physician cannot at the present time use the information in this book.

The Larynx and Its Diseases. By Chevalier Jackson, M.D., Sc.D., LL.D., F.A.C.S., Professor of Bronchoscopy and Esophagoscopy, Temple University, Philadelphia, and Chevalier L. Jackson, A.B., M.D., M.Sc. (Med.), F.A.C.S., Professor Clinical Bronchoscopy and Esophagoscopy, Temple University, Philadelphia. 555 pages, illustrated. Philadelphia: W.B. Saunders Company, 1937.

A textbook of five hundred pages on diseases of the larynx seems astounding. It is. The authors apologize for their English, which is quite unnecessary. The medical profession has learned to know and value properly the wonderful work of Jackson on bronchoscopy, but here we have the best volume yet presented in any language on disorders of the talking box. The two pages on "Hoarseness" are easily worth the price of the book. The various plates illustrating laryngeal disorders are excellent. Every specialist in diseases of the throat or chest should study this book and consult it frequently. Nowhere else can one find such complete and usable advice so readily available.

Pediatric Dietetics. By N. Thomas Saxl, M.D., F.A.C.P., F.A.A.P., Associate and Lecturer in Diseases of Children, New York Postgraduate Medical School, Columbia University; Assistant Attending Physician, Babies' Ward, New York Postgraduate Hospital. Foreword by Adolph G. DeSanctis, M.D., F.A.A.P., Director of Pediatrics at the New York Postgraduate Medical School and Hospital, Columbia University, New York. 565 pages, illustrated. Philadelphia: Lea & Febiger, 1937. Cloth $7.00.

This book follows very admirably the pattern set by the most popular of the recent books on general dietary management. The first two chapters deal with digestion in infancy and childhood and a description of the various types of food with reference to their chemical and vitamin composition. The chapters on infant feeding are complete and sound. In the section on the dietetic management of pediatric diseases, the author shows excellent judgment and balance in describing just enough of the pathology of the disease to enable the reader to understand the purpose and limitation of the suggested menus. In addition to sample menus, there are appended a list of commercial foods that enable a suitable diet to be prepared without too much effort in cooking. The appendix includes menus and tables of food values. The book is well set up and the illustrations and tables are good.

An Introduction to Comparative Biochemistry. By Ernest Baldwin, B.A., Ph.D., Fellow of St. John's College, Cambridge University Demonstrator in Biochemistry, Cambridge. With a foreword by Professor Sir Frederick Gowland Hopkins, F.R.S. 112 pages, illustrated. New York: The Macmillan Company. Cloth $1.50.

This stimulating little book portrays the chemical evolution of animals. The gradual changes which have occurred in such important functions as osmotic regulation, nitrogen excretion, hydrogen-ion regulation, and oxidation are discussed. It is far removed from clinical medicine, but will be of interest to the biochemist, the physiologist and to the clinical investigator who applies these subjects to the study of patients.

Hemophilia, Clinical and Genetic Aspects. By Carroll LaFleur Birch, M.D., Assistant Professor of Medicine, University of Illinois. 151 pages, illustrated. Urbana, Illinois: University of Illinois Press, 1937. Cloth $2.50.

This work is a summary of the results of a nine-year study of 98 hemophiliac patients. The first portion of the book deals with the clinical and laboratory findings; the second portion with the genetic aspects of the disease; and the latter are of especial interest and has been exhaustively studied by the author. The book has numerous illustrations, including particularly excellent photographs of the joint deformities produced by this disease. The clinical portions of the book are of practical value while the genealogical study, which has been carried out with unusual care, will be found especially useful by geneticists and other students of heredity.

Southern Medical News

ALABAMA

Dr. George E. Newton, Scottsboro, has been made Health Officer of Lauderdale County to succeed the late Dr. Wilder D. Hubbard, Florence.

Dr. Carl T. Martin, Abbeville, has been made Health Officer of Henry County to succeed Dr. Wallace L. Chambers, resigned.

Dr. William P. Hixon, Birmingham, and Miss Roberta Mims Knowles were married recently.

Dr. Robert C. Winslow, Sylacauga, and Miss Virginia Kirby were married May 30.

Dr. A. Abramson, formerly of Mobile, has moved to Alexandria, Virginia.

Dr. W. E. Wilson, Russellville, has been taking postgraduate work in Chicago.

Deaths

Dr. George Alonzo Cryer, Anniston, aged 59, died May 23.

Dr. James LaFayette Houston, Comer, aged 65, died in May of injuries received in an automobile accident.

Dr. Eugene S. Miller, Childersburg, aged 54, died recently of pneumonia.

Dr. S. E. Deal, Tuscaloosa, aged 69, died July 15.

Dr. W. H. Greer, Sheffield, aged 59, died August 9.

Dr. D. W. Ward, Tuscaloosa, aged 56, died July 29.

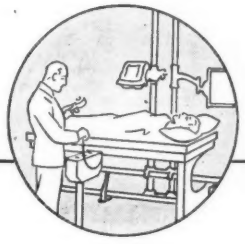
ARKANSAS

Dr. Benjamin C. Middleton, Texarkana, has been made Health Officer of Miller County.

Continued on page 30

How Much do your Intensifying Screens Help

YOUR X-RAY EQUIPMENT?



THE PURPOSE of intensifying screens is to improve such factors as contrast and speed in making X-ray negatives. However, in order to use intensifying screens to fullest advantage, it is necessary to carefully select them for quality and type.

Because the X-ray machines and tubes of today are extremely sensitive and highly refined pieces of equipment, they must be used in conjunction with intensifying screens which are just as highly refined . . . otherwise this expensive equipment will not function to best advantage.

You can insure best results from your X-ray equipment by standardizing on Patterson Intensifying Screens. For Patterson Screens are the accepted standard for high quality throughout the world . . . and you can select *exactly* the type or types of screens you should have from the comprehensive Patterson Line. Your dealer will gladly furnish complete information.

NEW AND HELPFUL INFORMATION
The following new Patterson Leaflets are now available: (1) Cassette Contact; (2) Care of Intensifying Screens; (3) Patterson Mounting Paste and Method of Mounting Intensifying Screens. Send for any in which you are interested.

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Continued from page 962

Dr. A. B. Robertson, Rison, has been made Health Officer of that city.

Dr. Fount Richardson, Fayetteville, has been made Physician to the University of Arkansas.

Dr. T. A. Peterson, Wynne, has been made Vice-President of the Lions Club of that city.

Dr. S. A. Thompson, Camden, has been made Vice-President of the Camden Lions Club.

Dr. J. L. Merrell, Walnut Ridge, has been made Commander of the American Legion, Fourth District.

Dr. E. E. Estes, Fordyce, has been made a Director of the Country Club of that city.

Dr. Fount Richardson, Fayetteville, Dr. Raymond Cook, Little Rock, and Dr. J. C. Ogden, Fort Smith, have been taking post-graduate work in Europe.

Dr. John McCollough Smith, Morrilton, and Miss Marie Angehr were married June 17.

DEATHS

Dr. John Grace, Belleville, aged 69, died May 24.

Dr. Thomas B. Blakely, Coal Hill, aged 78, died May 17 of carbuncle of the neck and erysipelas.

Dr. William Edgar Brunson, Sherrill, aged 59, died May 31 of lober pneumonia.

Dr. Augustine Mathias Zell, Little Rock, aged 54, died April 23 from an accidental gunshot wound.

Dr. Edward Bryant Milburn, Calico Rock, aged 63, died April 10 of acute dilatation of the heart.

Dr. William A. Clark, Bald Knob, aged 68, died July 8.

DISTRICT OF COLUMBIA

Dr. Henry H. Hazen, Washington, has been made President of the Washington Social Hygiene Society, succeeding Dr. William A. White, deceased.

Dr. Arthur Davidman, formerly of Logan, West Virginia, has moved to Washington.

DEATHS

Dr. James Smith McIlhenny, Washington, aged 72, died May 25 of coronary occlusion.

Dr. Willard Mercer Lane, Washington, aged 50, died May 10.

Dr. William Joseph Duncan, Washington, aged 37, died July 8 of strychnine poisoning.

Dr. Nellis Frances Witter Stephenson, Washington, aged 67, died May 29 of hypertension and heart disease.

Dr. Gershom Franklin White, Washington, aged 63, died recently of heart disease.

FLORIDA

The Florida Pediatric Society has elected the following officers for the coming year: Dr. Douglas Martin, Tampa, President; Dr. Warren W. Quillian, Coral Gables, Secretary.

Dr. C. C. Collins, Jacksonville, has been made Chairman of the Duval County Board of Public Instruction.

Dr. E. H. Carnes, formerly of Key West, has moved to Memphis, Tennessee.

Dr. Albert W. Lewis, formerly of St. Augustine, has moved to Atlanta, Georgia.

Dr. Jess V. Cohn, Hollywood, has been doing research work in Cincinnati.

Dr. Annette M. Bieker, St. Petersburg, announces her association with Dr. O. O. Feaster in the practice of radiology and physiotherapy.

Dr. C. A. Peterson and Mrs. Camille Burroughs Blanton, both of Jacksonville, were married June 16.

Continued on page 32

DOCTOR! YOU ARE INVITED TO ATTEND

THE OKLAHOMA CITY CLINICAL SOCIETY'S

EIGHTH ANNUAL FALL CLINICAL CONFERENCE

NOVEMBER 1, 2, 3, 4, 1937

Sixteen Distinguished Guest Lecturers

DR. JOHN W. AMESSE, Pediatrics, Denver, Assoc. Prof. of Ped., Med. Sch., Colo. Univ.; Attending Ped., Children's Hosp. and Colo. Gen. Hosp., Denver.

DR. WILLIAM L. BENEDICT, Ophthalmology, Rochester, Prof. of Opth., the Mayo Foundation, Univ. of Minn. Med. Sch.

DR. WILLIAM BOYD, Pathology, Winnipeg, Prof. of Pathology, Univ. of Manitoba; Pathologist, Winnipeg, Gen. Hosp.

DR. C. E. BURFORD, Urology, St. Louis, Prof. of Urology and has the Chair of Urology, St. Louis Univ. Med. Sch.

DR. FREDERICK CHRISTOPHER, Surgery, Evanston, Assoc. Prof. of Surg., Northwestern Univ. Med. Sch.; Chief Surg. of Evanston Hosp.

DR. H. EARLE CONWELL, Orthopedics, Birmingham, Attending Orthopedic Surg., St. Vincent's Hosp., South Highland's Infirmary, Children's Hosp., Crippled Children's Clinic, Hillman Hosp., Birmingham.

DR. WALTER DANNREUTHER, Gynecology, New York, Prof. of Gyn. and Dir. of the Dept., N. Y. Post-Graduate Med. Sch. and Hosp., Columbia Univ.

DR. CLAUDE F. DIXON, Surgery, Rochester, Assoc. Prof. of Surg., Univ. of Minn., Graduate Sch. (Mayo Foundation).

DR. CHEVALIER L. JACKSON, Bronchoscopy and Esophagoscopy, Philadelphia, Prof. of Clin. Bronchoscopy and Esophagoscopy, Temple Univ. Sch. of Med., and Hosp.

DR. SAMUEL A. LEVINE, Cardiology, Boston, Assistant Prof. of Med., Harvard Med. Sch.; Senior Assoc. in Med., Peter Bent Brigham Hosp., Boston; Consultant in Cardiology, Newton Hosp., Newton, Mass.

DR. E. PERRY McCULLAGH, Endocrinology, Cleveland, Assoc. Prof. of Med. in Charge of Endocrinology-Frank E. Bunts Lectures; Head of Section of Endocrinology and Metab., Cleveland Clinic, Cleveland.

DR. NORMAN F. MILLER, Obs. and Gyn., Ann Arbor, Prof. and Head of Dept. of Obs. and Gyn., Univ. of Mich.

DR. BERNARD H. NICHOLS, Roentgenology, Cleveland, Head of Section of Roentgenology, Cleveland Clinic, Cleveland.

DR. CYRUS C. STURGIS, Internal Med., Ann Arbor, Prof. of Med., Director Thomas Henry Simpson Memorial Institute for Medical Research; Director Dept. of Internal Med., Univ. of Mich.

DR. J. H. J. UPHAM, Internal Med., Columbus, Ohio, Dean of College of Med., and Prof. of Med., Ohio State Univ. College of Med., Columbus; President American Medical Assn.

DR. FRED W. WEIDMAN, Dermatology, Philadelphia, Prof. of Dermatological Research, Prof. of Dermatology and Vice-Dean in Dermatology and Syphilology, Graduate Sch. of Med.

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SAFEGUARDS *in* MASTOID SITUATIONS

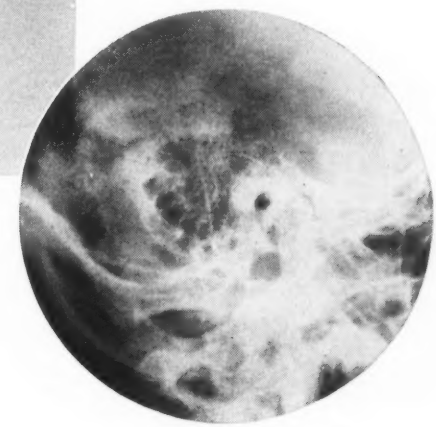
CLINICAL evidence based upon the usual classical signs ordinarily will lead to a diagnosis in acute mastoiditis. Radiographic study is necessary, however, to classify the mastoid as to type—whether it is pneumatic, diplöic, or sclerotic—to determine the extent of pathogenic invasion and the location of the transverse venous sinus.

In complaints of chronic aural discharges, deafness, or earache, x-ray examination will disclose whether the mastoids are involved . . . show whether there is invasion of the pars petrosa . . . reveal the presence of tumors.

Preoperative—Postoperative

Thus, preoperatively, radiographs provide information essential to effective handling of the case. . . . At operation the graphic images serve as an accurate map of the area. . . . Postoperatively, follow-up x-ray studies are the most convenient way to check up on progress.

In any situation where the mastoids may be involved, comprehensive examination by a competent radiologist is an invaluable safeguard. Eastman Kodak Co., *Medical Division*, Rochester, N. Y.



Radiograph of the mastoid process

Radiograph of the pars petrosa

RADIOGRAPHS PROVIDE DIAGNOSTIC FACTS

Continued from page 30

Dr. James L. Chalker and Miss Mary C. Fore, both of Ocala, were married recently.

Dr. Fauntelroy Harris Schnauss, Jacksonville, and Miss Jewell Edith Wiggins were married June 5.

Dr. Carl S. Lytle, Dunellon, and Miss Carolyn Endsley were married May 30.

Dr. Donald Paul Bird, Lakeland, and Miss Mildred Elaine Lewis were married recently.

DEATHS

Dr. Sarah Lucretia Robb, Gainesville, aged 84, died May 2.

Dr. Walter Rupert Weiser, Daytona Beach, aged 67, died April 13 of heart disease.

Dr. Herbert M. McConathy, Tampa, aged 67, died April 1 of chronic myocarditis.

Dr. Guy Stewart Peppers, Fort Pierce, aged 56, died April 20.

GEORGIA

Dr. James J. Clarke, Atlanta, was elected President of the Chattahoochee Valley Medical Association at its recent annual meeting at Radium Springs, Albany. Dr. Frank K. Boland, Atlanta, was reelected Secretary-Treasurer.

Dr. Camp H. Holmes, Atlanta, has been made President of the American College of Chest Physicians.

Dr. W. A. Selman, Atlanta, has been made President of the Emory Medical Alumni Association for 1937 and Dr. Marion C. Pruitt, Atlanta, has been made Secretary-Treasurer.

Dr. Albert W. Lewis, Jr., Atlanta, has opened offices on Cascade Avenue.

Dr. Hugh E. Hailey, Atlanta, is taking postgraduate work in Europe and will return on October 1 to be associated with his brother, Dr. William Howard Hailey.

Dr. Clarence Palmer, formerly of Warm Springs, has moved to Covington.

Dr. Benager Columbus Teasley, Jr., Atlanta, and Miss Mary Brooks were married recently.

Dr. Virginia Petway, Atlanta, and Dr. Thaddeus Mario McNamara, Jr., Bakersfield, California, were married recently.

Dr. Robert Lee Patterson, Jr., Athens, and Miss Margaret Douglas Sloane were married May 1.

DEATHS

Dr. Charles Dunbar Roy, Atlanta, aged 70, died July 5 of cerebral thrombosis.

Dr. Walter Edgar Barber, Atlanta, aged 52, died May 24 of coronary thrombosis.

Dr. Wilbur Fisk Culpepper, Senoia, aged 80, died May 17 of hypostatic pneumonia.

Dr. Robert Huse Purple, Atlanta, aged 62, died May 10 of pulmonary tuberculosis.

Dr. Cicero Gibson, Thomson, aged 70, died May 30.

Dr. George E. Youmans, Adrian, aged 60, died April 9.

Dr. S. W. Stiles, Atlanta, aged 78, died April 12 of cardiovascular renal disease.

Dr. Edward Clay Robinson, Augusta, aged 61, died April 10 of hemiplegia, cerebral hemorrhage and hypertension.

Dr. James T. Elder, Farmington, aged 76, died June 7.

Dr. John Wyatt McClain, Pelham, aged 69, died June 10 of heart disease.

Dr. O. W. Statham, Leesburg, aged 76, died May 19.

Dr. William Henry Steele, Griffin, aged 67, died June 17.

Dr. William James Shaw, Rome, aged 69, died June 21.

KENTUCKY

A Testimonial Dinner was given by the Jefferson County Medical Society on July 1 to Dr. Irvin Abell, Louisville, President-Elect of the American Medical Association, at the Pendennis Club, Louisville, with the following guest speakers: Dr. W. Barnett Owen, Louisville, President, Jefferson County Medical Society, Toastmaster; Dr. H. H. Shoulders, Nashville, Tennessee, Vice-Speaker of the House of Delegates of the American Medical Association; Dr. Ernest B. Bradley, Lexington, President, American College of Physicians; Dr. Fred W. Rankin, Lexington, President, Southeastern Surgical Society; Dr. Arthur T. McCormack, Louisville, Secretary, Kentucky State Medical Association; Dr. H. G. Reynolds, Paducah, President-Elect, Kentucky State Medical As-

Continued on page 34

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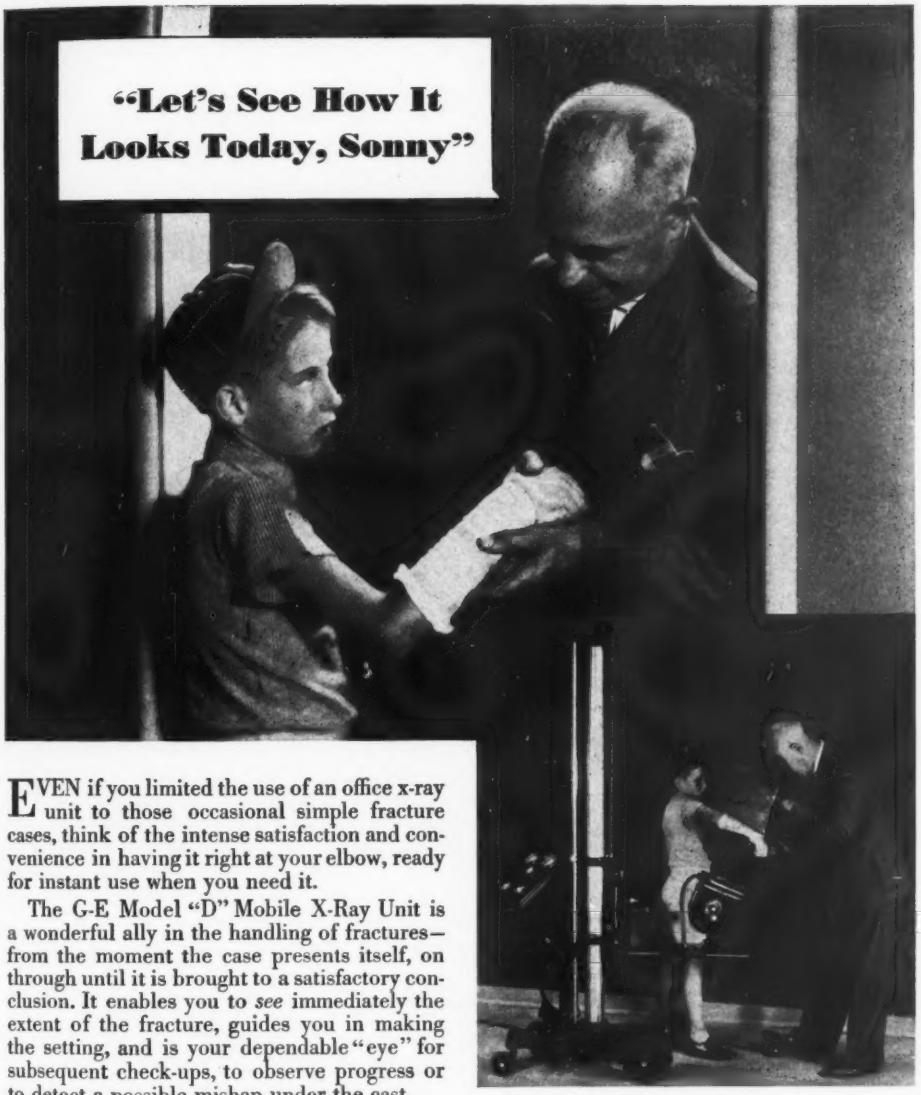

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Fracture Course For Graduates

usually given in October by the Fracture Service at the Massachusetts General Hospital will not be offered in 1937 owing to the construction of the new surgical building now going on at the hospital and due to lack of other facilities. It is expected this course will be resumed in 1938.

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SCHOOL OF MEDICINE

OFFERS

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for graduates.

Next course begins October 4th.

For full information address

DEAN

Washington University School of Medicine,

St. Louis, Missouri

Continued from page 32

sociation; Dr. J. D. Northcutt, Covington, President, Kentucky State Medical Association; and Dr. W. D. Haggard, Nashville, Tennessee, Past-President of the American Medical Association. The Sisters of St. Joseph's Infirmary, where Dr. Abell has worked during all his professional life, gave him a Testimonial Dinner on June 17, which was attended by all the members of the staff. Dr. Abell is a Past-President of the Southern Medical Association.

The Kentucky State Medical Association will meet in Richmond, September 13-16, instead of in Berea, September 6-9, as was first announced.

Dr. Chadwick W. Christine, Flemingsburg, has been made Assistant Health Officer of Jefferson County.

Dr. George Bronaugh Ewing, Smith's Grove, and Miss Anna Geraldine Keen were married May 29.

DEATHS

Dr. Holly M. Baxter, Bohon, aged 64, died May 19 of pneumonia.

Dr. Park McConnell Gilmore, Covington, aged 56, died recently of heart disease.

Dr. Edward Brent Houston, Murray, aged 56, died May 9 of cerebral hemorrhage.

Dr. W. Hamilton Long, Louisville, aged 57, died August 8.

Dr. James Berkley Settle, Sandgap, aged 72, died May 12 of injuries received when struck by an automobile.

Dr. Henry Thomas Sparks, Olive Hill, aged 52, died recently of cerebral hemorrhage.

LOUISIANA

Dr. John F. Dicks has been made Professor of Gynecology and Associate Director of the Department at Tulane University of Louisiana School of Medicine, New Orleans.

Dr. William D. Phillips, formerly on the staff at Tulane University of Louisiana School of Medicine, has been made Professor and Head of the Department of Gynecology, Louisiana State University Medical Center, New Orleans.

Dr. Martin A. Ruoma, formerly of New Orleans, has moved to Springfield, Missouri.

Dr. O. P. Myers, formerly of New Orleans, has moved to Indianola, Mississippi.

Dr. S. S. Kety, formerly of New Orleans, has moved to Picayune, Mississippi.

DEATHS

Dr. Russell Edward Stone, New Orleans, aged 58, died June 18 following an operation for appendicitis.

Dr. John Bunyon Johns, Bethany, aged 72, died April 10 of chronic malaria.

MARYLAND

The Medical and Chirurgical Faculty of Maryland will hold its semi-annual meeting at Hagerstown on September 7.

Dr. Phineas J. Sparer has been made Director of the Bureau of Tuberculosis of the Baltimore Health Department.

Dr. Maurice Sullivan, Baltimore, has opened offices on East Eager Street for the practice of dermatology and syphilology.

Dr. David H. Andrew, formerly of Wytheville, Virginia, has been made Director of the Bureau of Communicable Diseases in the Baltimore Health Department, succeeding Dr. Adolph Weinzirl.

DEATHS

Dr. John W. Linthicum, Catonsville, aged 75, died recently of nephritis and heart disease.

Dr. John Randolph Winslow, Baltimore, aged 71, died June 26 of chronic myocarditis.

Dr. Jacob J. Weaver, Jr., Uniontown, aged 88, died April 10.

MISSISSIPPI

The King's Daughters' Hospital Staff, Gulfport, has elected the following officers for the coming year: Dr. C. A. McWilliams, President; Dr. E. E. Sheeley, Secretary.

Dr. Joseph B. Thigpen, Bay Springs, has been made Health Officer of Jasper County.

Dr. Edward C. O'Cain, Winona, has been made Health Officer of Montgomery County to succeed Dr. James P. Synnott.

Dr. Archie S. Calhoun, Mount Olive, has been made Health

Continued on page 36

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ATABRINE has received recognition not only in hundreds of published reports in medical journals throughout the world but also in a number of our standard textbooks on medicine and pharmacology. This constitutes a remarkable tribute to the important position which this relatively new drug occupies in the treatment of the various forms of malaria.

Atabrine has attained such prominence because of its manifold advantages over previous therapeutic agents. In the vast majority of cases, a short course with this drug produces quick extermination of the parasites, with prompt disappearance of the symptoms. Hence, as shown by numerous statistical studies, the possibility of relapses has been greatly reduced. Furthermore, Atabrine therapy has proved the most comfortable way of curing malaria.

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539 M

Continued from page 34

Officer of Covington County to succeed Dr. George T. Cranford, Seminary.

Dr. C. M. Murry, Ripley, has been made Health Officer of Tippah County.

Dr. S. S. Kety, formerly of New Orleans, has moved to Picayune.

Dr. O. P. Myers, formerly of New Orleans, has moved to Indianola.

Dr. Gwin Mounger has located in Yazoo City.

Dr. Rogers Mayo Flint, Newton, and Miss Eddie Erline Russell were married June 17.

The Tulane University of Louisiana

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The following types of POSTGRADUATE instruction in all branches of medicine are offered to graduate physicians:

(a) Courses leading to advanced degrees.

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(Either of the above courses are adaptable towards satisfying certain requirements of the various specialty boards)

(c) Short intensive courses in special limited fields.

(d) Review courses intended for practicing physicians.
(These review courses will begin January 3, 1938, and will continue for two six weeks' periods, either one or both of which may be taken)

(e) Extra-mural teaching through the Extension Division.

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LOCATION for young Physician in the best town in Middle Tennessee, population 6,000. Physician retiring on account of health. A splendid equipped office for rent and my office furniture for sale. Must come well recommended. Address B, care SOUTHERN MEDICAL JOURNAL, Birmingham, Ala.

ASSISTANCE OFFERED TO MEDICAL WRITERS. Research. Abstracts. Translations (all languages). Papers prepared from author's data. Ten years' experience with leading physicians and appointments on medical journals of highest standing. I employ no assistants; all my work is done personally and is reliable. Florence Annan Carpenter, 1801 Sixteenth St., N. W., Washington, D. C.

DEATHS

Dr. Everett Edwin Robinson, Sr., Meridian, aged 60, died April 14.

Dr. Sylvan Myers, Vicksburg, aged 63, died recently of coronary thrombosis.

Dr. Lucien Carl Feemster, Tupelo, aged 64, died May 25 of cerebral hemorrhage.

Dr. James D. Mooney, Crystal Springs, aged 69, died April 30.

MISSOURI

Dr. Leon Paul Forgrave, St. Joseph, has been made a member of the State Board of Health to succeed Dr. William T. Elam, St. Joseph.

Dr. Joseph Erlanger, St. Louis, was given the Honorary Degree of Doctor of Science by the University of Michigan.

Dr. Martin A. Ruoma, formerly of New Orleans, has moved to Springfield.

Dr. Otis Dewey Seabaugh and Miss Dorothy Achilles, both of Webster Groves, were married June 5.

DEATHS

Dr. Howard Milton Smith, Kansas City, aged 57, died April 13 of pneumonia.

Dr. Susan Dora Wilson Peyton, St. Louis, aged 80, died May 12 of heart disease.

Dr. James Buchanan Prichard, St. Louis, aged 77, died May 11.

Dr. Harry H. O'Kelly, Portageville, aged 82, died May 31 from injuries received in a fall.

Dr. Julia E. Blaich, St. Louis, aged 66, died recently of chronic interstitial nephritis.

Dr. Elmer C. Jefferies, Rea, aged 78, died May 9 of chronic myocarditis.

Dr. Sidney D. Lawson, Kansas City, aged 55, died in May.

Dr. Gustave Lippman, St. Louis, aged 68, died May 23 of carcinoma of the stomach.

Dr. Franklin Worthington Bush, Hannibal, aged 86, died May 19 of arteriosclerosis.

Dr. M. P. Overholser, Harrisonville, aged 78, died June 19.

NORTH CAROLINA

Dr. J. W. Vernon, Morganton, has been made President of the State Board of Medical Examiners.

Dr. Sigma V. Lewis, Roxboro, has been made Health Officer of Washington, Tyrrell and Hyde Counties.

Dr. Zack P. Mitchell, Bryson City, has been made Health Officer of Cherokee, Clay and Graham Counties.

Dr. Philip G. Padgett, Forest City, has been made Assistant Health Officer of Swain County.

Dr. Jabez H. Williams, Sanatorium, has been made Health Officer of Sampson County.

Dr. G. W. Lawson, formerly of Chapel Hill, has moved to Lumberton.

Dr. Frank Edmondson, Jr., Tarboro, and Miss Sara Narcissus Wariner were married June 15.

Dr. Phares Yates Green, Apex, and Miss Melba Hunt were married June 19.

Continued on page 38

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Petrolagar is a mechanical emulsion of pure liquid petrolatum (65% by volume) and agar-agar. Accepted by the Council on Pharmacy and Chemistry of the American Medical Association for the treatment of constipation.

Petrolagar

Continued from page 36

Dr. Elijah Eugene Menefee, Durham, and Miss Eleanor Chittenden were married June 5.

Dr. R. O. Jones, Lumberton, and Miss Margaret C. Moore were married June 2.

Dr. Robert Erwin Long, Roxboro, and Miss Leiotte Rose Hall were married June 26.

Dr. Wyman Plate Starling, Roseboro, and Miss Kathleen Cogdell were married June 18.

Dr. Robert D. Croom, Maxton, and Miss Rosa Currie were married June 8.

Dr. Everett Irving Bugg and Miss Annie Laurie Newsom, both of Durham, were married June 10.

Dr. Jacob Harrison Shuford, Hickory, and Miss Robin Fraley were married June 18.

Dr. John William DeVine, Jr., and Miss Clara Cunningham Roberson, both of Durham, were married June 30.

Dr. Levy A. Coleman, Salisbury, and Miss Janet Monroe were married recently.

Dr. John W. Griffis and Miss Kathryn Sexton, both of Denton, were married recently.

Dr. Louis Carroll Roberts and Miss Jessie Speight Ward, both of Durham, were married April 23.

Dr. Samuel E. Way, Rocky Mount, and Miss Lillian Pauline Dixon were married April 14.

Dr. William Gardner Morgan, Benson, and Miss Mary Virginia Neal were married recently.

Dr. William Bount Norment and Miss Katherine Williams, both of Greensboro, were married April 27.

Deaths

Dr. David Patton Burleson, Jr., Spruce Pine, aged 27, died May 16.

Dr. Nathan Walser Mackie, Yadkinville, aged 37, died May 21 of chronic nephritis and cirrhosis of the liver.

Dr. Coite L. Sherrill, Statesville, aged 49, died June 24 from a heart attack.

Dr. J. W. Dickie, Southern Pines, aged 44, died July 5 from heart disease complicated by pneumonia.

Dr. Ronald Corbin Gyles, Siler City, aged 43, died June 19 of coronary thrombosis.

OKLAHOMA

Dr. L. P. Hetherington, formerly of Pawnee, has moved to Miami.

Dr. Howard B. Shorbe, Oklahoma City, announces his association with the McBride Clinic and the Reconstruction Hospital.

Dr. M. C. McNew, Ada, is taking postgraduate work in New York.

Dr. Claude B. Waters, Marietta, is taking postgraduate work in Vienna.

Dr. Imogene Butts Mayfield, Holdenville, has been on a medical lecture tour of the European countries.

Deaths

Dr. David Stevens, Okmulgee, aged 83, died recently of arterial hypertension and uremia.

Dr. Robert R. Walker, Oklahoma City, aged 72, died April 24 of angina pectoris.

Dr. Richard Emmett Thacker, Oklahoma City, aged 64, died April 1 of heart disease.

Dr. Oscar A. Lambert, Okmulgee, aged 71, died April 23 of acute dilatation of the stomach.

SOUTH CAROLINA

Dr. Julius H. Taylor, Columbia, has resigned as President of the South Carolina Medical Association on the advice of his physician and has been succeeded by Dr. L. M. Stokes, Waterboro, Vice-President of the Association.

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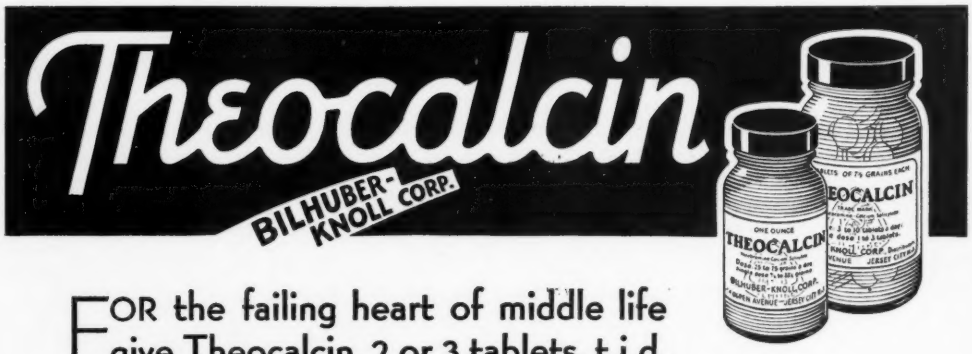

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Continued from page 38

Dr. William Fishburne, Monck's Corner, has been made President of the South Carolina Public Health Association.

Dr. James R. Howell, Aiken, recently resigned as Superintendent of the Aiken County Hospital.

Dr. Robert Mabry Dacus, Jr., and Miss Bina LaVerne Valentine, both of Greenville, were married April 19.

DEATHS

Dr. Henry David Rowe, Orangeburg, aged 67, died in May.

Dr. James Robert Gibson, Inman, aged 70, died May 16 of coronary occlusion.

Dr. Lewis Minort Daniels, Columbia, aged 46, died May 2.

Dr. John Cabeen Caldwell, Chester, aged 47, died May 10 of carcinoma of the liver.

TENNESSEE

Dr. Elbert G. Wood, Knoxville, was made President-Elect of the Tennessee Valley Medical Association at the recent meeting in Knoxville, and Dr. Edward A. Guynes, Knoxville, was installed as President. Dr. Jesse C. Hill, Knoxville, was elected Secretary.

Dr. Webster B. Key, Memphis, has been made a member of the State Public Health Council, succeeding Dr. John C. Ayres, Memphis, resigned.

Dr. Fray O. Pearson, Knoxville, has been made Director of the Upper Cumberland Health Unit.

Dr. Oscar S. Hauk, formerly of Donelson, has been made Acting Head of the Eastern State Hospital, Knoxville.

Dr. E. H. Carnes, formerly of Key West, Florida, has moved to Memphis.

Dr. W. T. Pride, Dr. Carey G. Bringle and Dr. James M. Brockman, Memphis, announce their association in the Woman's Clinic for the practice of gynecology and obstetrics.

Dr. Howard Thompson Holden, Chattanooga, and Miss Dorothy Helen Rodes were married June 23.

Dr. C. G. Bringle, Memphis, and Miss Eva Gene Gruce were married June 14.

Dr. H. W. Otey, Memphis, and Miss Virginia Cooper were married June 24.

Dr. Richard Henry Walker, Johnson City, and Miss Mabel Barbara Callahan were married June 10.

Dr. Glenn T. Scott, Jr., Memphis, and Miss Frances Lawrence were married recently.

Dr. Vernon Atwill Turner, Bristol, and Miss Elizabeth Josephine Parsons were married April 10.

DEATHS

Dr. Eddie Abram Gulledge, Memphis, aged 64, died May 17.

Dr. James Monroe Capps, Bakerville, aged 72, died May 4.

Dr. Reese Q. Lillard, Lebanon, aged 74, died May 3.

Dr. Harman Richard Townsend, Oakville, aged 51, died April 14 from drowning.

Dr. Jessie Beaumont Atkins, Clarksville, aged 73, died May 13 of cerebral hemorrhage.

Dr. John Roberts, Kingston, aged 67, died April 29 of myocarditis and arteriosclerosis.

Dr. R. E. Lee Smith, Doyle, aged 73, died June 7.

Dr. E. C. Ramer, Memphis, aged 35, died June 29.

Dr. C. M. Womack, Lawrenceburg, aged 64, died June 28.

Dr. Frank B. Clark, Gainesboro, aged 53, died May 7.

TEXAS

The Texas State Board of Medical Examiners has elected the following officers for the coming year: Dr. Oliver B. Kiel, Wichita Falls, President; Dr. Wiley C. Morrow, Greenville, Vice-President; Dr. Thomas J. Crowe, Dallas, Secretary.

Dr. William P. Harrison, Teague, has been made President of the State Board of Health to succeed Dr. Elbert W. Wright, Bowie.

Dr. Edgar M. Dunstan, Dallas, has been made Superintendent of the Dallas City and County Hospital System, succeeding Dr. James H. Stephenson, who has been made Superintendent of the Jefferson Davis Hospital, Houston.

Dr. T. N. Goodson, San Antonio, has been made County Health Officer.

Dr. J. L. Goforth, Dr. H. W. Cochran and Dr. Ben Rubenstein, Dallas, have been made members of the City Health Advisory Board.

Continued on page 42

CONSTIPATION

is frequently associated with dehydration of the bowel content. This makes the stools small, hard, and less capable of either stimulating or responding to normal peristalsis.

MUCILOSE

corrects these etiologic factors by holding water in the feces, preserving the normal fecal colloid*, increasing responsiveness to peristalsis and thus producing a large, soft and pliable stool which is easily expelled.

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*Oelgetz, A. W., Oelgetz, P. A., and Wittekind, J.: Studies in Bowel Drainage, Am. J. Digest. Dis. & Nutrition 3:549 (Oct.) 1936.

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City_____State_____

Continued from page 40

Dr. Burke Brewster, Fort Worth, has been made Head of the Health Department of the Fort Worth Public Schools to succeed Dr. Charles F. Hays, resigned.

Dr. Evan W. McChesney, formerly Associate Professor of Biological Chemistry, University of North Carolina School of Medicine, Chapel Hill, has been given the same title at Baylor University College of Medicine, Dallas.

Dr. Stuart P. Cromer, formerly of Chicago, has been made Superintendent of Baylor University Hospital, succeeding Dr. Edgar M. Dunston, resigned.

Dr. Charles J. Wagner, Lubbock, was recently given the honorary degree of Doctor of Science by Monmouth College, Monmouth, Illinois.

Dr. L. T. Waller, Commerce, is taking postgraduate work in New Orleans.

Dr. J. Marvin Rape, San Angelo, has been taking postgraduate work in New Orleans.

Dr. T. G. Rogers, Decatur, has returned after taking postgraduate work in New York.

Dr. E. W. Moss, Wellington, has been taking postgraduate work in St. Louis, Missouri.

Dr. Roscoe Bennett Gray Cowper, Big Springs, and Miss Mary Joy Odom were married June 21.

Deaths

Dr. Walter C. Smith, Caddo Mills, aged 78, died recently.

Dr. James William Osborn, La Feria, aged 73, died May 21.

Dr. Jason Tyson, Santa Anna, aged 69, died May 13 of carcinoma of the liver.

Dr. Clarence Lamoine Power, Temple, aged 67, died May 24 of coronary thrombosis.

Dr. George Michael Goddard, Waxahachie, aged 69, died May 11 of carcinoma of the stomach.

Dr. William J. Brewer, Perryton, aged 65, died May 1.

Dr. Lee Orrion Foster, Sunray, aged 56, died in May.

Dr. Edward Stanton Imel, Sr., El Paso, aged 74, died May 29 of myocarditis and arteriosclerosis.

Dr. Mattie Isabel Foster Hill, El Paso, aged 66, died May 11 of cerebral hemorrhage and hypertension.

Dr. Charles W. McFarling, Tulia, aged 64, died April 3 of influenza and pneumonia.

Dr. Samuel Andrew Woodward, Fort Worth, aged 64, died May 6 of pulmonary infarction following a fracture of the right femur received in a fall.

Dr. Harry Gilmer Walcott, Dallas, aged 58, died June 2.

Dr. Edward L. Wedemeyer, Waco, aged 67, died June 2 of congestive heart failure.

Dr. C. C. Shotts, Poteet, aged 58, died April 26 of coronary occlusion.

VIRGINIA

The Southern Tuberculosis Conference and the Southern Sanatorium Association will hold their meeting in Richmond September 29-October 1.

Dr. Glenn T. Foust, Norton, has been made a Vice-President of the Tennessee Valley Medical Association.

The Medical Society of Virginia will meet in Roanoke October 12-14.

The Bedford County Medical Society has elected the following officers for the coming year: Dr. M. P. Rucker, Bedford, President; Dr. R. A. Bennett, Bedford, Vice-President; Dr. W. V. Rucker, Secretary-Treasurer.

Dr. James N. Dudley, formerly of Danville, has been made Health Officer of Northampton County.

Dr. Linwood Farley, Ashland, has been made Assistant Health Officer of the Valley Health District.

Dr. William Grossmann, Richmond, has been made Epidemiologist in the Bureau of Communicable Diseases of the State Health Department.

Dr. B. Randolph Allen, Luray, has been made Health Officer of the Pittsylvania County Health Department, succeeding Dr. W. H. Walcott, resigned.

Continued on page 44

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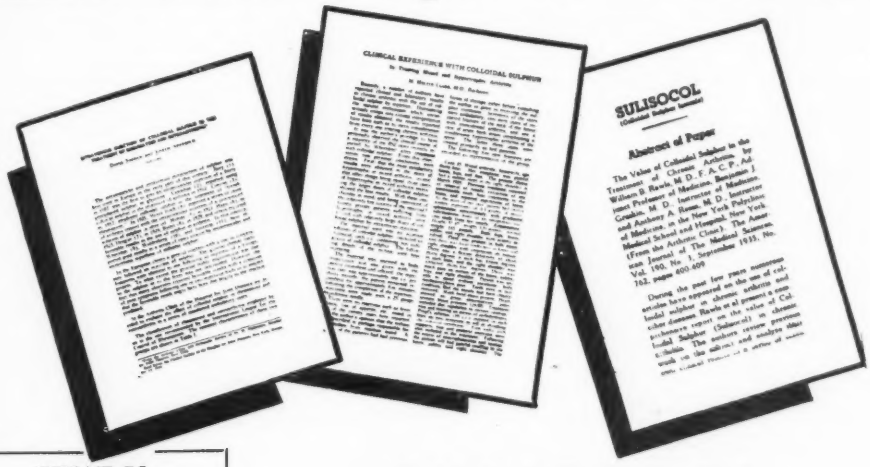

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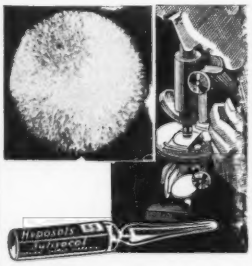

Ultra-microphotograph showing Brownian movement and fineness of dispersion of Sulisocol.

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Contiuued from page 42

Dr. R. Campbell Manson, Newport News, has resigned as Assistant Health Officer of the Arlington County Health Department.

Dr. H. B. Magill, Jr., Norfolk, has been appointed Health Officer of the Hanover County Health Department.

Dr. J. N. Dudley, formerly Health Officer of the Henrico County Health Department, has been made Health Officer of the Northampton County Department of Health.

Dr. Channing Glenn, Petersburg, has been made City Physician of that place.

The Portsmouth Country Club has elected the following officers for the coming year: Dr. E. W. Rawls, President; Dr. J. W. Abbitt, Vice-President; Dr. F. P. Barrow and Dr. George H. Carr, Jr., Directors.

Dr. T. S. Jennings, Waverly, has been made President of the Waverly Rotary Club.

Dr. Meade Edmunds, Petersburg, has been made Chairman of the Interclub Committee of the Lions Club of that city.

The Medical College of Virginia, Richmond, has now under construction its first dormitory for men, the building to cost $315,000.00, which will house the house staff of the college hospitals and the senior medical class, and will be located in the hospital center. The building will contain, in addition to the typical dormitory rooms, a cafeteria, private dining rooms, an assembly hall, barber shop and other facilities and will be dedicated next spring.

Dr. David H. Andrew, formerly of Wytheville, has moved to Baltimore, Maryland, where he has been made Director of the Bureau of Commmunicable Diseases in the Baltimore Health Department.

Dr. Walter R. Parker, formerly of Woodland, North Carolina, has moved to Northampton County.

Dr. V. E. Lascara, formerly of Wilmington, Delaware, has moved to Norfolk.

Dr. A. Abramson, formerly of Mobile, Alabama, has moved to Alexandria.

Dr. Girard V. Thompson, formerly of Richmond, has moved to Chatham.

Dr. James Eugene Hemphill, Petersburg, and Miss Mary Nancy Ray were married June 21.

Dr. William Fielding Bryce, Richmond, and Miss Helen Marguerite Thacker were married July 20.

Dr. John Philip Lynch and Miss Helen Mansfield Davis, both of Richmond, were married June 25.

Dr. Carl Wise Meador and Miss Margaret Anita Mitchell, both of Richmond, were married July 7.

Dr. William Wallace Fuller, Richmond, and Miss Annie Olive Bess were married July 10.

Dr. Frederick Ralph Person, Williamsburg, and Miss Dorothy Italena Speese were married June 5.

Dr. Edward Rhodes Stitt, Norfolk, and Mrs. James Thornwell Newton were married May 3.

Dr. Charles W. Reavis, Richmond, and Miss Allie Virginia Cheek were married recently.

Dr. Nowell Darden Nelms and Miss Virginia Bell Newsom, both of Newport News, were married April 13.

Deaths

Dr. Edward Griffith Maupin, Portsmouth, aged 86, died May 18.

Dr. Frederick F. Davis, Sassafras, aged 67, died July 19.

Dr. John Newton DeShazo, Center Cross, aged 62, died June 26 from a heart attack.

Dr. William C. Ford, Woodstock, aged 71, died July 8.

Dr. William Beckwith Fuqua, Jr., Radford, aged 34, died June 29.

Dr. Hugh Hatch Hill, Locust Dale, aged 79, died June 15.

WEST VIRGINIA

The Golden Clinic of the Davis Memorial Hospital, Elkins, held its annual seminar July 14.

Dr. Walter E. Vest, Huntington, has been made President of the Public Health Council of West Virginia.

Dr. Arthur Davidman, formerly of Logan, has moved to Washington, D. C.

Dr. Charles Houston Gay, Martinsburg, and Miss Mary Irvine Carter were married June 29.

Deaths

Dr. William Forest Dailey, Terra Alta, aged 68, died May 12.

Dr. John Earl McCreery, Beckley, died April 9.

Dr. John F. Bigony, Hinton, aged 68, died June 12.

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Dextri-Maltose, Carbohydrate of Choice

In gastrointestinal disorders, "Dextri-maltose has been preferred to the other sugars as apparently less irritating." — *E. Cassie and U. Cox: The examination of the gastric contents in infants, with some considerations as to the value of lactic acid milk in infant feeding, Lancet, 2:322-325, August 14, 1926.*

"As to the kind of extra carbohydrate to be added, whether lactose or maltose, I believe dextri-maltose to be better in general in cases of fat indigestion (infantile atrophy)."—*C. H. Dunn: The Hygienic and Medical Treatment of Children, Southworth Co., Troy, New York, 1917, V. 1, p. 418.*

In the treatment of decomposition, "The period of repair may be shortened by giving suitable additional food; the best, probably, being buttermilk to which carefully regulated proportions of dextrin and maltose preparations or malt soup are added."—*E. Feer: Text-Book of Pediatrics, J. B. Lippincott Co., Phila., 1922, p. 284.*

In infantile atrophy, "The carbohydrate should be increased by gradual addition of dextrimaltose.

"Malt soup or dextrimaltose (Mead's) should be added in teaspoonful or more doses to each feeding until the point of carbohydrate tolerance is reached."—*L. Fischer: Diseases of Infancy and Childhood, F. A. Davis Co., Phila., 1925, V. 1, p. 285.*

In the case of a premature infant, "Dried milk with water was given, which later was changed to whole milk, 14 ounces; water, seven ounces, and dextri-maltose No. 1, one and one-half ounces. Seven feedings of three ounces each every three hours was given. The above feeding was retained. The infant gained eight ounces at the end of the first week."—*L. Fischer: Clinical notes in a series of premature infants, Arch. Pediat. 44:227-231, April, 1927.*

In the treatment of decomposition, "As a rule it is best to start with 2 to 2½ or 3 ounces of albumin milk to the pound weight in 24 hours; the sugar to be added is in the form of a maltose-dextrin mixture. One should never delay too long in adding this."—*C. G. Grulee: Infant Feeding, W. B. Saunders Co., Phila., 1922, p. 265.*

With reference to hypotrophy, "In mild cases, the addition of dextrimaltose instead of cane or milk sugar may be sufficient to obtain a gain in weight."—*C. Herrman: The treatment of nutritional disorders in artificially-fed infants, New York M. J. 114:158-160, August, 1921.*

In athrepsia, "The carbohydrates are usually added in a slowly fermentable form, such as the maltose and dextrin compounds, which are usually started by the addition of four grams per kilogram (1/15 ounce per pound) and increased until eight grams or more per kilogram (¼ ounce per pound) of body weight are added."—*J. H. Hess: Feeding and the Nutritional Disorders in Infancy and Childhood, F. A. Davis Co., Phila., 1928, p. 278.*

Concerning the treatment of marasmus, "When the stools have become smooth and salve-like, carbohydrate, in the form of dextrimaltose, may be gradually added up to the limit of tolerance."—*L. W. Hill: Practical Infant Feeding, W. B. Saunders Co., Phila., 1922, p. 281.*

In the feeding of prematures, "As soon as there is a hesitation in the gain in weight, dextrimaltose No. 1 is substituted for the dextrose, in the same amount in the mixture, with almost invariably a gain in weight."—*F. B. Jacobs: Relation of irradiated food substances and ergosterol versus cod liver oil in childhood nutrition, Pennsylvania M. J. 35:164-167, Dec., 1931.*

"A spasmophilic baby on bottle feeding should receive a limited amount of milk—a pint, or at the most 24 ounces in the 24 hours—to which cereal gruel and some form of sugar is added, preferably one of the malt dextrin preparations; also the early addition of other foods than milk to the baby's diet."—*M. Jampolis: Infantile spasmophilia, Interstate M. J. 25:652, Sept., 1918; abst. Arch. Pediat. 35:691, Nov., 1918.*

In cases of malnutrition and indigestion, "The appetite improves rapidly, and the stools soon become normal in appearance, if the sugars are intelligently prescribed. By this I refer to proper proportions of dextrin and maltose. When there is a tendency to looseness, I have used the preparation known as 'dextri-maltose,' for the extra carbohydrates; . . ."—*M. Ladd: Further experience with homogenized olive oil mixtures, Arch. Pediat., 33:501-512, July, 1916.*

In pyloric stenosis, "With low dextrose tolerance, a maltose dextrin preparation may be added in whole or in part. Even where the dextrose is well tolerated and gain in weight has ceased, impetus to the weight ontake may be given by the addition of a maltose dextrin preparation."—*D. J. Levy: Pyloric stenosis and pylorospasm of infancy with especial reference to medical treatment, J. Michigan St. M. S., 21:166-170, April, 1922.*

With reference to the treatment of diarrhea, "After several days, 2% to 3% of a maltose-dextrin preparation may be added (Dextri-Maltose). This is preferable to the easily fermentable lactose or cane sugar."—*F. Lust: The Treatment of Children's Diseases, J. B. Lippincott Co., Phila., 1930, p. 145.*

In dyspepsia, "The carbohydrate must not be allowed to exceed 3 per cent. Dextri-maltose is the most suitable sugar."

In the treatment of decomposition, atrophy, malnutrition, marasmus), ". . . when there has been obvious improvement, dextri-maltose is gradually increased from 3 to 5 per cent."—*B. Myers: The nutritional disturbances of infancy, Brit. M. J., 1:1079-1083, June 21, 1924.*

"The treatment of artificially fed children in the first of these groups consists in putting them on a low fat dietary, and giving them carbohydrate in the form of one of the less fermentable sugars—e.g., dextrimaltose."—*L. G. Parsons: Wasting disorders of early infancy, Lancet, 1:687-694, April 5, 1924.*

In the milder cases of inanition, "Regulation of this disturbed organismal balance is obtained by the addition of carbohydrates, while fat and casein are reduced. For this purpose dextrimaltose and flour are better than the ordinary sugars, since they are more slowly absorbed and have greater efficacy in their powers of controlling the flora in the large intestine."—*W. J. Pearson and W. G. Wyllie: Recent Advances in Diseases of Children, P. Blakiston's Son & Co., Phila., 1930, p. 116.*

In intestinal intoxication, "I have had more experience with dried skimmed milk in which 2 to 5 per cent dextrimaltose, barley or rice flour has been cooked, and the mixture subsequently fermented by lactic acid bacilli or soured with lactic acid, than with any other food except protein milk."—*G. F. Powers: A comprehensive plan of treatment for the so-called intestinal intoxication of infants, Am. J. Dis. Child., 32:232-257, August, 1926.*

Regarding the treatment of the marantic infant, "After the intolerance to sugar has been overcome a carbohydrate, preferably Dextri-maltose, may be added."—*C. S. Raue: Diseases of Children, Boericke & Tafel, Phila., 1922, p. 427.*

In spasmophilia, "Dextri maltose is the best sugar to use in these cases, in the proportion of 6 to 8 per cent."—*J. H. Reading, Jr.: Spasmophilia, Hahneman. Monthly, pp. 403-411, July, 1922.*

In the treatment of atrophy, "If the baby continues to improve, the next step in the treatment is to add to the milk one of the less fermentable carbohydrates, such as dextrimaltose; . . ."—*H. Thursfield and D. Paterson: Diseases of Children, William Wood & Co., 1929, p. 105.*

"I also find dextrin-maltose an excellent addition to albumin-milk when the first object of that food has been achieved and a gain in weight is desired; in this way I have succeeded in feeding albumin-milk far beyond the period usually advised, with highly gratifying results." — *F. L. Wachenheim: Infant-Feeding; Its Principles and Practice, Lea & Febiger, Phila., 1915, p. 158.*

"Dextri-maltose has been substituted for lactose not infrequently, when the tolerance for the latter continues low."—*J. H. West: Low fat, high starch evaporated milk feeding for the marasmic baby, Arch. Pediat. 48:189-193, March, 1931.*

"Malt sugar is indicated when others fail to produce a sufficient gain, or when malassimilation of fat is evident."—*O. H. Wilson: The role of carbohydrates in infant feeding, Southern M. J. 11:177, March, 1918; abst. Arch. Pediat. 35:447, July, 1918.*

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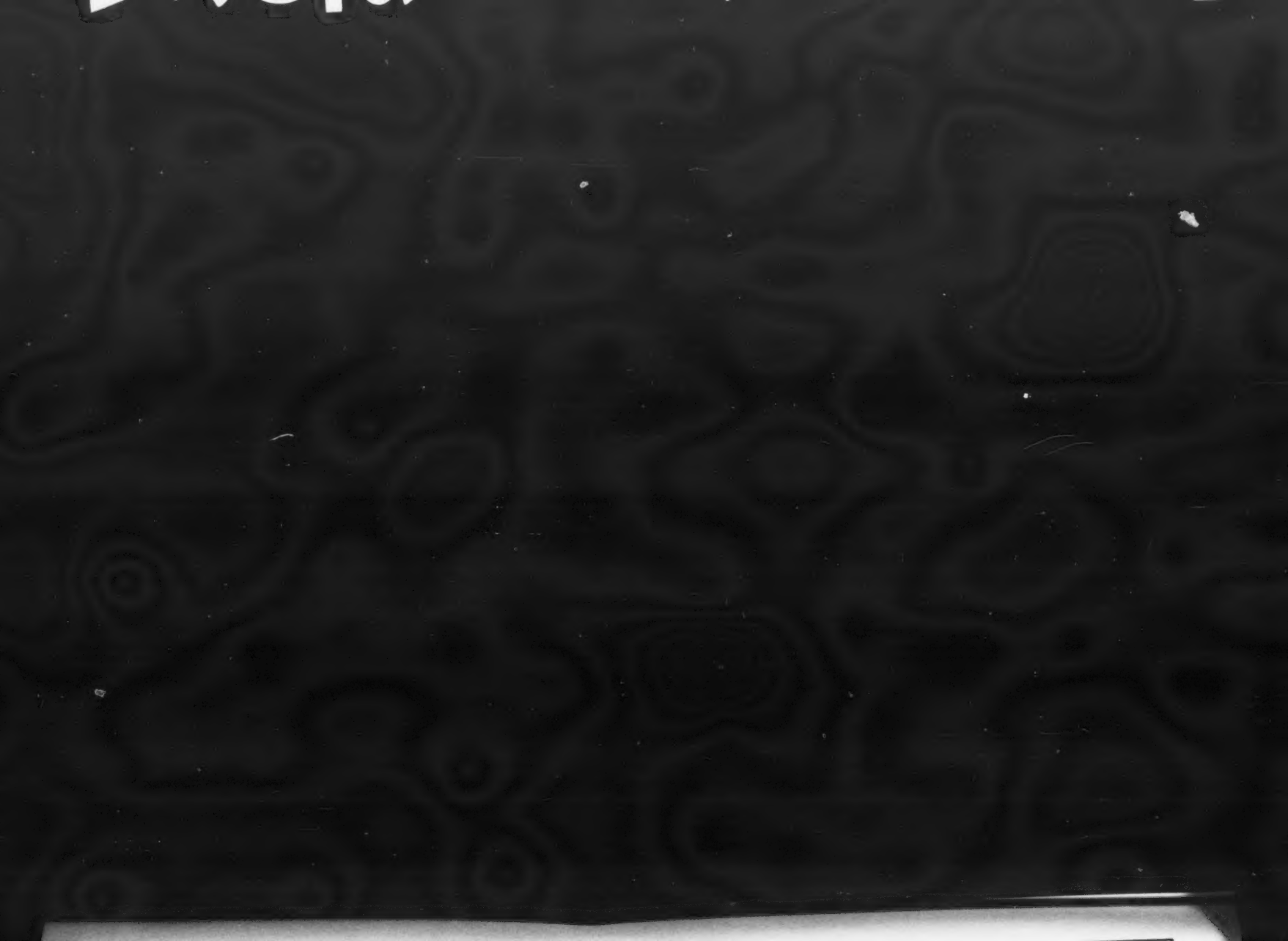
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